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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

kly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1978 by CW Communications/Inc.

October 30, 1978 $1.00 a copy; $25/year

Intended as a high-end extension of IBM's small business systems line, the System/38 sports a raft of 'firsts,' including a previously unavailable operating system, compressed logic circuitry and 32K-bit memory chips.

IBM Packs System/38 With Technological 'Firsts'

By Jeffry Beeler
CW Staff

ATLANTA — IBM has combined its latest memory technology with enhanced logic circuitry and previously unavailable operating software to create a general-purpose system that reportedly provides an upward expansion path for users of the firm's System/3 and System/34 processors.

Described as an upper end addition to IBM's small business systems line, the System/38 bulges with technological "firsts," both hardware and software. These advances are said to include:

- An unbundled operating system that marks the first change IBM's General Systems Division (GSD) has made in its software architecture since 1969.
- Logic chips that package bipolar circuits 28 times more densely than in the System/3.
- The first reported use of 32K-bit memory chips, which cycle in 600 nsec.
- IBM's first implementation of RPG-III.
- A virtual storage technique termed "single-level storage management."

IBM spokesmen characterized the System/38 as a "workstation-oriented" offering that supports 40 CRT terminals as a practical maximum. They also credited the System/38 with providing an improved price/performance ratio compared with the System/3, although the sources declined to specify how much of an improvement the latest system offers.

Most of the System/38's reported boost in price/performance stems from the advances in semiconductor technology or from the introduction of a licensed operating system called the Control Program Facility (CPF), which addresses six to seven times more basic instructions than the System/3. The CPF integrates functions like workstation support, data base management, security facilities, communications support and message facilities, which its GSD predecessors do not.

Like IBM's recently announced 8100 [CW, Oct. 9], the System/38 offers main storage built around 64K-bit memory chips. Unlike that previous system, however, the company's latest offering packs four of these chips onto one 256K-bit random-access memory (RAM) module occupying 1 sq in.

The system also incorporates 36K-bit RAMs comprised of 18K-bit chips and 128K-bit RAMs consisting of 32K-bit chips, the sources added.

Using the 256K-bit modules and the 64K-bit chips, the System/38 report-

(Continued on Page 4)

If Employers Take Carter Cue

Many DPers May Feel Salary Pinch

By Brad Schultz
CW Staff

WASHINGTON, D.C. — Virtually all DP professionals will earn less next year than expected if U.S. employers enforce the 7% lid on annual salary increases proposed last week by President Carter to help his Administration fight inflation.

Although the plan is called voluntary, an employer who fails to comply with the 7% lid faces denial of contracts, "privileges" or other benefits, Carter stated.

Among DPers, the median salary rose 12.4% from mid-1977 to mid-1978, according to a Fox-Morris Personnel Consultants study that also showed 16% to 18% gains by programmers, an "almost 20%" increase for DP communications and auditing specialists and growth exceeding 20% for "top-level" DP executives over the same period [CW, July 17].

An Association for Systems Management study found the 1977 DP salary median ($24,786) 32% higher than the 1974 median ($18,749) [CW, July 3].

Who Will Feel It More?

The higher paid DP workers — programmers, systems analysts and DP managers — will be more disturbed by the 7% lid than will keypunchers and computer operators, according to Robert White, chairman of the Association of Computer Programmers and Analysts (Acpa).

But Data Processing Management Association (DPMA) president Delbert W. Atwood Jr. said the constraint inflicts a sharper sting in the less lucrative ranks, because more affluent DPers can better afford the prospective financial setback.

White predicted Carter will fail to win widespread public support for his voluntary anti-inflation program and has merely "delayed the inevitable: mandatory controls."

Resource shortages or other circumstances may well force manufacturers to raise prices by more than 7% in order to obtain any profit, White explained, adding that labor unions will not adhere to the 7% wage limit if prices climb at a faster rate.

Nevertheless, DP users and vendors alike should give the program a try, the Acpa chief declared.

However, somewhat at odds with the Carter policy, White said that business-sector DP salaries should be peg[illegible] to corporate profitability, allowing salary hikes commensurate

(Continued on Page 4)

Processor Lets IBM 3270s Run on X.25 Packet Nets

By Ronald A. Frank
CW Staff

BURLINGTON, Mass. — IBM 3270 CRT systems running under the Binary Synchronous Communications (BSC) protocol will reportedly be able to operate in X.25 packet-switched networks if they use the 9100 series Network Interface Processor introduced by Cambridge Telecommunications, Inc. (CTX).

A multiple-microprocessor interface device, the 9100 allows a 3271 controller to communicate with a packet-switched network based on the X.25 standard even though the 3270 subsystem operates in BSC mode, a spokesman said.

The 9100 accepts conventional BSC formatted data from the 3271 controller and converts it into a High-Level Data Link Control (HDLC) bit stream that is compatible with X.25 networks. The installation of the 9100 at a remote site requires no changes in the IBM 3270 subsystem, CTX said.

When operating in an X.25 network, the 9100 processor acts as a concentrator, taking BSC input and translating it into an HDLC bit stream for transmission on a packet network.

Two models of the 9100 were introduced by CTX. The 9101 handles in-

(Continued on Page 6)

MVS Insights Gained

By Don Leavitt
CW Staff

LONDON — The use of a small-batch jobstream run on a large-scale IBM 370 configuration monitored by SMF has provided some insights into the effectiveness of IBM's MVS environment, according to the consultant who supervised the experiment at BOC Datasolve, a service bureau operated under British Oxygen Corp.

Speaking to a technical session at a recent meeting of the European Computer Measurement Association (Ecoma-6), Brian Long explained that the test setup was required since the company could not modify the production environment, in which SMF data was regularly collected, "just to determine what could be done under MVS."

Instead, the Datasolve technicians developed a jobstream made up of 100 jobs — obtained by duplicating a "much smaller number" of basic job types. These were a mixture of Cobol, Assembler and Fortran compilations and link-edits together with a number of different jobs executing IBM utilities, he noted.

The hardware consisted basically of a 4M-byte IBM 370/158 multi-

CW coverage on Ecoma-6 continues on Pages 6, 18 and 19.

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OTHER EDITORIAL OFFICES: Washington, D.C. : 821 National Press Building, 529 14th Street N.W., Washington, D.C. 20045. Phone: (202) 347-6718. **England:** Tony Vickers, IDG Publishing Ltd., 140-146 Camden Street, London NW1 9PF Phone: 01-267 1201. Telex: 851 264737. **W. Germany:** Hans-Jurgen Ballnath, Computerworld, c/o CW Publikationens, Friedrichstrasse 31, 8000 Munich 40, Phone: (089) 34-90-61. Telex: 5215350. **Asia:** Hidetsuna Sasaki, Computerworld, c/o Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461. **Australia:** John P. Costello, Computerworld Pty. Ltd., 3 Bruce Street, Crows Nest, NSW 2065. Phone: 929-5388, Telex: SECCO AA25468. **Brazil:** Eric Hippeau, Data News, c/o Computerworld do Brazil, Servicos e Publicacoes Ltda., Av. Rio Branco 156/Sala 1222, Rio di Janeiro ZC 21 Brazil. Phone: 242-7395. Telex: 212-1507.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1978 by CW Communications/Inc. All rights reserved. Reproduction of material appearing in *Computerworld* is forbidden without written permission. Send all requests to Marion Kibbee. $1.00 a copy: U.S.— $25 a year; Canada, Central & So. America — $35 a year; Europe and Near East — $75 a year; other foreign — $125 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.
Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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IBM's Christensen to Keynote

DPMA Conference Begins Today

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) International Conference and Business Exposition is set to open at the New Orleans Hilton Hotel today with 60 exhibitors displaying their wares in 100 booths.

This year's keynote speaker will be B.C. Christensen, vice-president and general manager of IBM World Trade Corp., who will talk on the international aspects of the DP business from a multinational corporation's point of view.

As a whole, the conference will examine proven solutions to DP and management problems in "real world" settings, according to a DPMA spokesman. More than 40 educational sessions will be offered, including a first-time special management panel that will outline the skills DP managers must develop to advance to corporate-level positions.

Speakers on this panel, entitled "DP Arrows Are Pointing to Management — Don't Lose Your Way," include Jerry W. Geckle, president of Peterson, Howell and Heather, Inc.; John L. Jones, vice-president of management information services, Southern Railway System; and Roy N. Linton, president and chief operating officer of the Standard Register Co.

Special Interest Seminars

Two DPMA special interest groups — one on computer output microfilm (COM) and the second on the Certificate in Data Processing (CDP) — will hold half-day seminars.

For a panel on COM, Robert Woody, U.S. Datacorp's corporate development manager, will talk on "Taking the COMplexity out of COM"; Mark Woods, marketing vice-president of Quantor Corp.'s COM Division will discuss "Alphanumeric COM Recorders"; and Larry Schieber, Information International, Inc. product specialist, will outline "Features and Capabilities of Graphic COM Recorders."

The CDP symposium will deal with the recent unified effort toward professionalism as it relates to DP management and practice. Speakers will include Beverly Madron, the CDP interest group's president; Mert Walker, vice-president of the Institute for the Certification of Computer Professionals; Gary Casper, president of the Society of Certified Data Processors; and Jim Brown, director-at-large of the Association of Computer Programmers and Analysts.

Mixed Bag

Educational sessions will cover a mixed bag of topics. For example, Robert Courtney, data security staff member at IBM in Kingston, N.Y., will present "A Rational Approach to Data Security"; Gerry Cullen, director of communications at Datapoint Corp.'s Data Processing Division, will discuss "Data Base Management in Dispersed Processing Systems"; and Tom McShane, marketing vice-president for Vadic Corp., will talk about "Telecommunications From the Terminal User's Viewpoint."

Also, the question "Do Minis Really Outperform Maxis?" will be answered by Robert R. Sumrall, Logical Computing Corp. president. Joseph T. Simone, national product manager of Decision Data Computer Corp., will tell how to go "From Data Processing Into Management — The Importance of Being 'Cost-Effective.' "

As in the past, the DPMA will confer its Computer Sciences Man-of-the-Year award, this year to Irwin J. Sitkin, vice-president of corporate data processing and administrative services for Aetna Life & Casualty Co. in Hartford, Conn.

Sitkin, who manages a $63 million DP and administrative services operation, will be honored at a luncheon Nov. 1 for developing Aetna's DP installation into one of the most sophisticated in the industry, both in technology and service, DPMA said.

DPMA New Orleans '78 is expected to draw more than 3,000 attendees including preregistrants and walk-ins, the spokeswoman said. Full conference preregistration, totaling about 800 persons, is up by over 30% from last year, when 45 companies exhibited in 68 booths.

Exhibitors this year will include IBM, which is expected to show its 8100 system; Boeing Computer Services, Inc.; Texas Instruments, Inc.; Control Data Corp.; Sycor, Inc.; Quantor; Memorex Corp.; 3M Co.'s Microfilm Products Division; and Standard Register Co.

Among those firms participating for the first time will be ITT Carrier Terminal Systems, Inc., Decision Data Corp. and Data Pathing, Inc.

The DPMA is headquartered at 505 Busse Highway, Park Ridge, Ill. 60068.

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A message from John R. Bennett
President of Applied Data Research
Princeton, New Jersey

"ADR is now into DB/DC"

After a long and careful study, ADR has concluded that the critical future needs of computer users can most effectively be answered by online data base and data communications systems; by systems that are fully compatible under all of IBM's DOS, OS and VS operating systems; and by systems that can be extended to distributive processing and new IBM hardware.

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Effective September 29, 1978, all of DATACOM's products, facilities and more than 60 professional staff members became part of ADR.

ADR will develop and enhance this new product line and provide technical support to its customers, just as we have serviced the 5000 customers who have purchased over 9000 of our system software products during the past 15 years.

Sincerely,

John R. Bennett

John R. Bennett, President
Applied Data Research, Inc.

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U.S., Europe To Debate Data Regulation

NEW YORK — A roster of key Europeans and Americans will square off here Nov. 28-30 for an exhaustive debate on "Data Regulation — European and Third World Realities."

Jan Freese and Rossiter W. Langhorne, authors of this week's In Depth (see Page 62), will continue their discussion at the conference, which is sponsored by Online Conferences, Ltd. of Uxbridge, England.

Expected to advance the American viewpoint are William Norris, Control Data Corp. president; Henry Geller, assistant secretary of the Commerce Department and head of the National Telecommunications and Information Administration; Vico Henriques, president of the Computer and Business Equipment Manufacturers Association; Earl Kendle of Eaton Corp.; Richard Neustadt, White House staff member; Alden Heintz of Tymshare, Inc.; and Harry DeMaio of IBM.

Spokesmen from Austria, Brazil, Canada, France, Germany, Sweden and the UK are also on the program, along with representatives from such international groups as the Organization for Economic Cooperation and Development, Council of Europe, North Atlantic Treaty Organization, Intelsat and the Intergovernmental Bureau for Informatics.

A brochure and further information on the conference are available from the Wayne Smith Co., Suite 810, 500 12th St. S.W., Washington, D.C. 20024.

Just in Case

Special to CW

SEATTLE — In an era where "onward and upward" is the computer hardware cry, the Boeing Co.'s purchase of three obsolete IBM 7094s may seem somewhat peculiar.

But there's a good reason for the purchase. The Wires Project, which tracks the wiring used on Boeing-built airplanes, still runs on the old computers.

True, a total rewrite of the Assembler-coded, sequential data processing system is well under way. But because of the magnitude of the massive sytsem — one of the four major data bases has 8,000 segments — the full conversion will take four more years.

Meanwhile, with Boeing's airplane business thriving and increasing (at least two new models are scheduled to come off the drawing boards), the company needs backup and expansion for the current system.

Emulation of the 7094 on newer generation equipment was considered and rejected. The company has progressed past its IBM 360/65s, which were capable of 7094 emulation, and an attempt to emulate the 7094 on an IBM 370/168 resulted in slower throughput than on the 7094.

The best 7094 emulator, the company decided, was the 7094 itself. So, in a diminishing market for the old computer, Boeing bought the threesome — "just in case."

Measly Raises in Store for DPers?

(Continued from Page 1)

with company profits as an employee incentive.

Wage Inflation

Wage inflation in the U.S. is discouraging domestic computer production, White said, adding a number of major vendors — such as Amdahl Corp. — are now inclined to establish foreign plants where labor is cheaper.

Wage inflation is also shaping the nature of the software marketplace, causing a growing demand for general-purpose "portable" software packages, he continued.

Such packages entail fewer man-hours of conversion effort as they are transferred from one CPU to another, which means lower DP labor costs for the user organization, he explained.

White and Atwood agreed there is little chance many federal DP jobs will be lost as the Carter Administration tries to improve government productivity, minimize waste and cut the enormous federal budget deficit. Carter has indicated that some government workers will be laid off and certain operations curtailed as a result.

White and Atwood also agreed that "Proposition 13 effects" will not result in DP budget slashes as top-level state and local government administrators grapple with the shrinking revenues imposed by tax cuts.

Public-sector DPers will not experience "great surprises" such as massive layoffs or project cancellations, they agreed. White added that recent civil service reform legislation provides "a more justified" evaluation of professional performance in government.

Whether or not the Carter plan succeeds, inflation may eventually price the highest paid DP professionals "out of the market" and provoke intensified recruitment and training of lower paid entry-level programmers, White concluded.

Price Limits No Problem

WASHINGTON, D.C. — Plummeting hardware costs allow computer vendors to easily hold prices within the limits of President Carter's voluntary wage/price controls program, according to a spokesman for the Computer and Business Equipment Manufacturers Association (Cbema).

The Carter plan announced last week asks U.S. business to limit price increases over the next year to .5% "below their annual rate of price increase during 1976-77."

A number of vendors indicated they would "toe the Carter line" weeks in advance of the President's anti-inflation proposal, the Cbema spokesman said.

Last month, Control Data Corp., IBM, Honeywell, Inc. and Hewlett-Packard Co. advised the Carter Administration they would comply with a White House call for voluntary price controls similar to the plan now before the nation.

IBM Packs System/38 With 'Firsts'

(Continued from Page 1)

edly fits a 256K-byte memory board, storing the equivalent of 40,000 eight-letter words, in a 4.5- by 7-in. space. The System/3, by contrast, uses 8K-bit technology and thus offers only one-eighth the packaging density of IBM's latest system.

Among its other large-scale integration features, the System/38 provides bipolar logic devices that hold up to 704 transistor-transistor logic (TTL) circuits — each with a 3 to 5 nsec nominal operating speed — on one 4.6 sq mm chip. Each System/3 logic chip, on the other hand, incorporates no more than 25 circuits, which operate at 8 to 12 nsec.

Because of the compression of the System/38's logic circuitry, the system's CPU mounts on one 10- by 15-in. planar board, the sources noted.

Data Base Management

The CPF, meanwhile, further contributes to the System/38's improved price/performance through its data base management facilities, workstation support, control language, single-level storage management, RPG-III and other features.

Using the data base management facility, multiple users can concurrently access centrally stored information in various formats and sequences, the spokesmen noted. While one user retrieves inventory records by stock number, for example, another user can access the same files by supplier number.

Single-level storage management, meanwhile, in effect unites main memory and auxiliary disk memory in one virtually addressable storage space, the spokesmen said. The technique frees users from storage management considerations like partitions, program overlays and file labels.

Independent Formatting

With RPG-III, an RPG-II extension that simplifies coding for workstation I/O, users can define CRT screen formats independently of a program and then retrieve those formats with one command.

Like RPG-III, the operating system's workstation support feature also lets users define screen formats independently of a program. It then permits users to code conditioning indicators, validity checking and command keys into a CPF-supported device file, the spokesmen said.

The control language — the System/38 equivalent of the System/3's Operator Control Language (OCL) — provides conditional branching and is used to request system functions. With this software feature, users can compile System/38 commands into programs that in turn can be called by RPG-III or control language programs.

SNA/SDLC Support

Among its other software features, the System/38 supports System Network Architecture/ Synchronous Data Link Control (SNA/SDLC) communications with IMS/VS or CICS/VS running on either the Series 30 processors or the 370/135 through 168 mainframes.

The system also offers System/3-to-System/38 batch conversion utilities plus conversion utilities for users of System/3's communications control program.

The System/38 comes in two versions — the Model 3 and Model 5 — both of which consist of an IBM 5381 system unit with a CPU, main memory, disk storage, console keyboard and CRT, diskette magazine unit and workstation controller.

The Model 3, however, stores a minimum of 512K bytes expandable to 768K or 1M byte, while Model 5 holds a minimum of 1.25M bytes expandable to 1.5M bytes. The Model 3 also incorporates the 64K-bit memory chips, which cycle in 1,100 nsec, while the Model 5 uses the 32K-bit devices, the spokesmen explained.

Both versions, however, provide the same set of 200 basic instructions which incorporate many supervisory, security and data base management functions.

They also support one to six 64.5M-byte nonremovable disk units for a total mass storage capacity of 387.1M bytes; a choice of Model 5251, 5252 or 5256 CRT terminals; and up to two printers — either the 300 line/min Model 5211 or the 650 line/min Model 3262, which was introduced as part of the System/38 announcement.

Hardware options available with the system include the 3410 and 3411 tape subsystems and 5424 multifunction card unit.

Typical System/38 users will include manufacturers, distributors and other businesses whose annual revenues range from $5 million to $100 million, IBM predicted.

Configurations, Prices

A small System/38 Model 3 with a 512K-byte CPU, 129M-byte disk unit, diskette magazine system, optional audible alarm, five 5251 workstations and one 5256 workstation printer costs $115,345 and leases for $3,444/mo, including software, under a three-year lease.

A "very large" Model 5 configuration consisting of a 1.5M-byte CPU, six 64.5M-byte disk systems, two 3262 printers, diskette magazine unit, audible alarm, one 3410 tape unit, three 3411 tape units, 32 Model 5251 workstations, eight 5256 workstations and 60 remote workstations linked to two SDLC communications lines sells for $760,995 and leases for $20,960/mo, including software, under a three-year lease.

Software Prices

CPF, RPG-III and the System/38 interactive data base utilities lease separately for $400/mo, $60/mo and $30/mo, respectively.

Shipments of the Model 3 and its associated software will start in August 1979, while first deliveries of Model 5 hardware are slated for February 1980.

Financial Privacy Act Seen Major Victory by Carter

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Carter Administration proclaimed a major victory for personal privacy with the recent passage of legislation that limits government access to personal financial records.

The Right to Financial Privacy Act, passed on the last day of the 95th Congress [CW, Oct. 23], requires government agencies to notify an individual when they seek his records from a bank or other financial institution and to advise him of legal steps he can take to try to stop disclosure of those records.

The bill, a response to the 1976 Supreme Court decision in U.S. vs. Miller regarding the privacy of bank records, was the product of a joint effort by the legislative and executive branches of the government, one member of the Carter Administration said. Its passage was "the biggest thing in privacy since [ex-] Sen. [Sam J.] Ervin's Privacy Act" — the Privacy Act of 1974, according to Arthur Bushkin, director of information policy programs in the National Telecommunications and Information Administration (NTIA).

Presidential Initiative

Congressional approval of the legislation marks the "first phase of the President's privacy initiative," Bushkin said. The President's privacy initiative was prompted by the work of the Privacy Protection Study Commission.

"The President instructed his Cabinet to develop a response to the Privacy Commission report," Bushkin explained. He is director of the initiative and was also a member of the Privacy Commission.

Two major recommendations resulted from the commission's work — that a "duty of nondisclosure" be placed on recordkeepers and that government access to personal records be limited.

The Financial Privacy Act addresses the latter recommendation, Bushkin pointed out. The logical next legislative step, he said, is to extend the privacy concepts to other types of records, such as medical and credit records.

However, the Administration has not decided on action in these additional areas, he said, noting the act also does not prohibit a financial institution from disclosing personal financial information to the private sector.

In any case, "in terms of the information policy of the U.S. and in terms of privacy protection for individuals, this is an enormous, enormous step forward," Bushkin maintained.

"Placing the concept in statute that the government can't have unrestricted access to records" is in line with the philosophy embodied in the Bill of Rights, he said.

This is "a victory," and victories in the areas of civil rights and individual rights to privacy are "not all that frequent," Bushkin said.

Bushkin praised the members of Congress who developed the legislation and showed a willingness to compromise when alternative language for the bill was suggested by several different executive agencies.

The Justice Department, in particular, had reservations about the legislation as originally drafted [CW, Aug. 25], but the NTIA was able to come up with a draft acceptable to both the legislative and executive branches.

Although the Justice Department was concerned about restricting law enforcement agencies' access to financial records, it "actually supported this legislation," which, Bushkin said, is "in sharp contrast to Justice Departments of previous administrations."

Even though the bill's provisions place an "administrative burden" on the government, the Administration believes the burden is acceptable considering the importance of individual privacy, he explained.

Trial Date Set for Ristol

LOS ANGELES — Arne Ristol, the 52-year-old self-employed bookkeeper accused of stealing nearly $1 million from a California bank, will face trial in federal district court here Nov. 27.

Ristol pleaded innocent to charges of grand theft earlier this month in connection with the disappearance of $927,288 deposited into his United California Bank account as the result of a keypunching error [CW, Oct. 2]. He is scheduled to appear before the court on Nov. 17 for a pretrial hearing.

Officials recently freed Ristol on bail when the federal district court reduced it from $100,000 to $75,000 at a bail hearing in mid-October. Ristol's attorney, Eugene Andres, had been petitioning the court for a reduction since his client's surrender in September.

To date, approximately $300,000 of the $927,288 has been located and nearly $50,000 has been recovered by the bank.

Although authorities initially believed Ristol had fled with the money to Florida, it was discovered upon his surrender that he had actually gone to Europe. Investigators suspect the stolen money was "laundered" by Ristol through a complicated series of deposits and withdrawals between American, Canadian and European banks.

Authorities also believe a number of accomplices were involved in Ristol's alleged activities.

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'Not Elegant, But It Works'

Simple Process Helps Airline Predict DP Needs

By Don Leavitt
CW Staff

LONDON — "It's not very elegant, it's not sophisticated, but for us it works so you're welcome to the ideas as long as you are willing to adapt them to your own situation."

That was the way systems programmer Bill Miller of American Airlines described how his installation "at least takes a stab" at predicting what computer resources it will need in the future.

Miller told a session of the sixth meeting of the European Computer Measurement Association (Ecoma-6), held here recently, that the process starts simply enough with a set of forms the development team is required to submit whenever a major project reaches the design phase. The forms force the designers to provide their best estimates of how the project will impact the center.

Starting with basics such as the implementation date, the forms also seek information, in terms of SMF data, on detailed computer resource requirements for each job step.

While there was some resistance to completing these forms when they were first mandated, Miller said the center's conscientious post implementation feedback has improved forecasting of later projects and made the designers far more cooperative.

In any case, he told the session, the information is summarized and posted to a SPF partitioned data set. A printout of the data, produced using the Easytrieve report writer package from Pansophic Systems, Inc. — "the quickest and easiest of the 'quick and dirty' approaches I know" — lists projects in sequence by implementation quarter.

That base report shows the estimated number of runs per month and the resource demands per run. The CPU minutes listed are generally provided by the designers and based on resources used by existing programs they feel are similar to the projected ones.

The second report converts the CPU minutes into decimal parts of IBM 370/168-3 for each new run, then totals the new load per quarter so that all concerned can see the cumulative effect of the incoming projects.

CW at Ecoma-6

The projections go three years into the future so if management or any one else sees a CPU increase that seems out of line, they can see the reason for it.

The use of a 168-3 as a base doesn't mean American is committed to getting that equipment, Miller emphasized. In fact, the airline has a 168 Attached Processor complex and an Amdahl Corp. 470V/6, but the 168-3 comparison provides a fixed point of reference, Miller said.

The projections of shared Direct Access Storage Device (DASD) and tape capcity required are a combination of data provided by the designers and some trend analysis work Miller and his crew have done.

The DASD load projections are based on experience which showed Miller that, at American, each 1% of CPU requires 60M bytes of disk space. That figure won't hold for every center, but there probably is a figure that does apply to a given center, he told his audience.

The tape drive projections are tied to American's anticipated growth in non-interactive applications, utilizing another figure culled from the airline's own experience "that probably isn't any good to anyone else in this whole room," Miller cautioned.

At the close of his representation, he reemphasized that his reports are only the first step in equipment planning at American. Miller's figures are given to the hardware analysts who reviewed them in the light of their own experience and knowledge of current or announced equipment.

The hardware analysts, in turn, pass their thoughts along to upper management, which adds its own special insight to the problem before making final decisions, Miller said.

Experiment Gives Insight Into MVS

(Continued from Page 1)

processor with six strings of IBM 3330 disks accessed through two 3830 controllers and two ISC paths, giving four separate data paths in all, he continued.

Twenty-One Jobstream Runs

Twenty-one separate runs of the jobstream were executed and data was collected using SMF and MF/1. The first eight runs — four uniprocessor (UP) and four multiprocessor (MP) — utilized 20 initiators and were run with differing amounts of main storage.

Seven more runs were executed in the MP environment with 4M bytes of main storage but with initiator loads ranging from one to 30. One immediate result of this series of tests was to show a maximum throughput rate was obtained at about 10 initiators but, the consultant noted, that breakpoint might have been caused by the limited disk space available.

The remaining six runs were also carried out in the MP mode with varied numbers of initiators and differing amounts of main storage, Long said.

Figures Vary

Summing up, he noted that although the useful work required from the system was a constant — the test jobstream — the total work needed to process the jobs through each environment was different. The system CPU time varied from 1155- to 592 sec, while the user CPU time ranged only from 620- to 564 sec.

Another figure that varied considerably was the basic amount of page I/O required, he pointed out. In particular, the page I/O increases both with reduced main storage and with an increased initiator load, "but neither of those results was a surprise."

The biggest changes occur in system CPU time, with an increase of 180 sec on a 373-sec base in moving from a UP to an MP setting, at zero page I/O, and an increase of 6.8 sec/1,000 page I/OS.

In the case of user CPU time, he went on, there was an increase of 40 sec on 534 in moving from UP to MP and an increase of only .68 sec/page I/OS/.

Long said the data reported referred to runs under MVS Release 2.0 but that the same jobstream was run later against MVS release 3.7 "and the same general picture emerged." There is, he noted, a linear relationship between CPU time and page I/O and an overhead associated with the MP environment.

Of course, he added, all the time values including user CPU time have been reduced under Release 3.7.

IBM 3270s Gain X.25 Link

(Continued from Page 1)

put from three BSC terminals, outputting one X.25-compatible data stream at speeds up to 9,600 bit/sec. The 9102 can handle eight BSC terminals, outputting up to four X.25 data streams at speeds up to 56k bit/sec.

Depending on user requirements, the 9100 can be programmed so 3270 terminals can access multiple applications in multiple hosts, similar to IBM's Advanced Communications Function (ACF), a CTX spokesman said.

The 9100 is used in conjunction with the Data Modified Emulator Program (DMEP), a software package introduced by CTX last year. The DMEP resides in an IBM 370X front end and allows IBM CPUs to be interfaced to X.25 networks without conversion to the Virtual Telecommunications Access Method (Vtam) or the Network Control Program (NCP).

The DMEP also contains a Network Operator Control Program (NOCP) that lets the user run remote diagnostics on the 9100 processor from the host CPU site.

Each group of four communications lines within the 9100 is defined as a Communication Line Processor (CLP) having its own dedicated microprocessor, program memory and dual-port data memory. The CLP controls both X.25 network access lines and user terminal lines, CTX said.

The CLP's dedicated 400 nsec, 8-bit microprocessor contains 16K to 64K bytes of memory as required by the user's network configuration. The CLP memory is divided into program and data space; each memory segment is a separate, isolated dual-port system. Thus the processor always has access to its program space without the contention that exists in the data space, CTX said.

The Network Protocol Processor (NPP) contains a microprocessor that provides the hierarchical management for the distributed micros as well as the implementation of the various user-level X-25 software. The NPP has its own dedicated program memory and controls the common I/O memory bus.

The 9100's data space is shared by the CLP and the NPP and is used for the storage of data as it is passed between the terminals and the network.

The 9101 costs $7,600 while the 9102 is priced at $18,500. First deliveries of the processor are scheduled for the first quarter of 1979. The DMEP software — required with the 9100 — costs $500 for installation in a 370X front end.

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WANG

IBM Witness Defends Firm's 'Dirty Pooling'

By Connie Winkler
CW Staff

NEW YORK — When IBM acquired Science Research Associates (SRA) in 1964, it used the same accounting methods for which an IBM expert witness in the U.S. vs. IBM case faulted Memorex Corp. and Telex Corp.

However, Abraham J. Briloff, professor of accountancy at the City University of New York's Baruch College, claimed the SRA incident was not as bad because of IBM's total financial picture and accounting practices at the time.

Through the practice — called "dirty pooling" by Briloff — IBM was able to "suppress" $63 million. He earlier criticized Memorex for "suppressing" $16 million [CW, Oct. 16].

"Dirty pooling" is a term Briloff coined to describe the recording of the acquisition of a subsidiary on the parent company's books at an amount less than the market value of the stock traded for the subsidiary.

In this way the parent company "suppresses" the true value of the acquisition, with the amount "suppressed" being the difference between market value of the stock traded for the subsidiary and the amount recorded for that stock. The practice makes the parent company look more profitable.

No Ready Answer

For IBM in 1963, there was no clear answer for how the $63 million should be accounted, Briloff said. To properly show the relation of revenue to expenses, Briloff recommended amortizing the $63 million over 10 years, adding only a $6.3 million write-off each year.

Given IBM's total revenue, this would amount to only a 1% annual impact, Briloff said.

"Had I seen the SRA situation in 1964 and my antenna was alert, this is not an example of dirty pooling I would have singled out for commentary because of the diminimus ramifications," Briloff said. Under questioning by judge David N. Edelstein, Briloff said the Memorex and Telex cases were worse — dirtier or dirtiest — pooling because earnings were being inflated "addictively" and expenses were also being deferred.

"When I see front-end loading of revenue and rear-end loading of expenses, all of that comes together as the dirtiest pooling and I am moved to write," said Briloff, who has done several articles on the subject.

Throughout his seven days on the stand, Briloff blasted the leasing companies for what he called 12-year straight line depreciation of computer equipment in the late 1960s and early 1970s. Briloff said such depreciation of a high-technology product by a leasing company was "absurd."

He contended the leasing companies had difficuties because of their accounting practices and not because, as the government suggested, of IBM's changes in products, pricing or maintenance practices.

McAdam's Ratios Discounted

Briloff also pooh-poohed as nonsensical various ratios of cash flow to stockholders' equity. These ratios were presented by government witness Dr. Alan K. McAdams more than a year ago. McAdams, a Cornell University economist who was on the stand for more than 70 days, was in the court room again for two days of Briloff's cross-examination.

In long and sometimes contorted replies, Briloff discounted all the ratios which McAdams had used to show IBM profits were underestimated. The ratios, based on cash flow accounting techniques, have no useful purpose, are misleading and since 1972 have been prohibited by the Securities and Exchange Commission, Briloff said.

McAdams used the ratios as a method of comparing various manufacturers of general-purpose computers. Nonoperating income was deducted in each of the calculations so the firms could be compared on strictly an operational basis. This eliminated the income IBM received from its security transactions and made the IBM return look bigger.

Government lawyer Alan Nisselson tried to draw out of Briloff — who strongly believes revenues should match expenses in all accounting — that IBM front-loads expenses by writing them off in the years they occur, particularly research and development expenses and marketing expenses.

If it could be clearly demonstrated that an R&D project produced revenue over a period of years, then that R&D expenditure should be considered as a capital expense over several years, Briloff said, in opposition to the Financial Accounting Standards Board's position. He would not agree, however, that marketing expenses should be spread out over a period of years.

During the cross-examination, Briloff also criticized public auditing firms which also do managerial and/or tax advocacy for the firms they audit. Briloff said he voiced this concern — that Price Waterhouse & Co. does IBM's auditing and also provides litigation support — to IBM. IBM counsel Joe Sahid objected, however, that the litigation support was for IBM's law firm, Cravath, Swaine & Moore.

That was just one of Sahid's objections, which became more frequent as the cross-examination continued and which in most cases were denied by Edelstein. Conflicts between Sahid and Edelstein were frequent.

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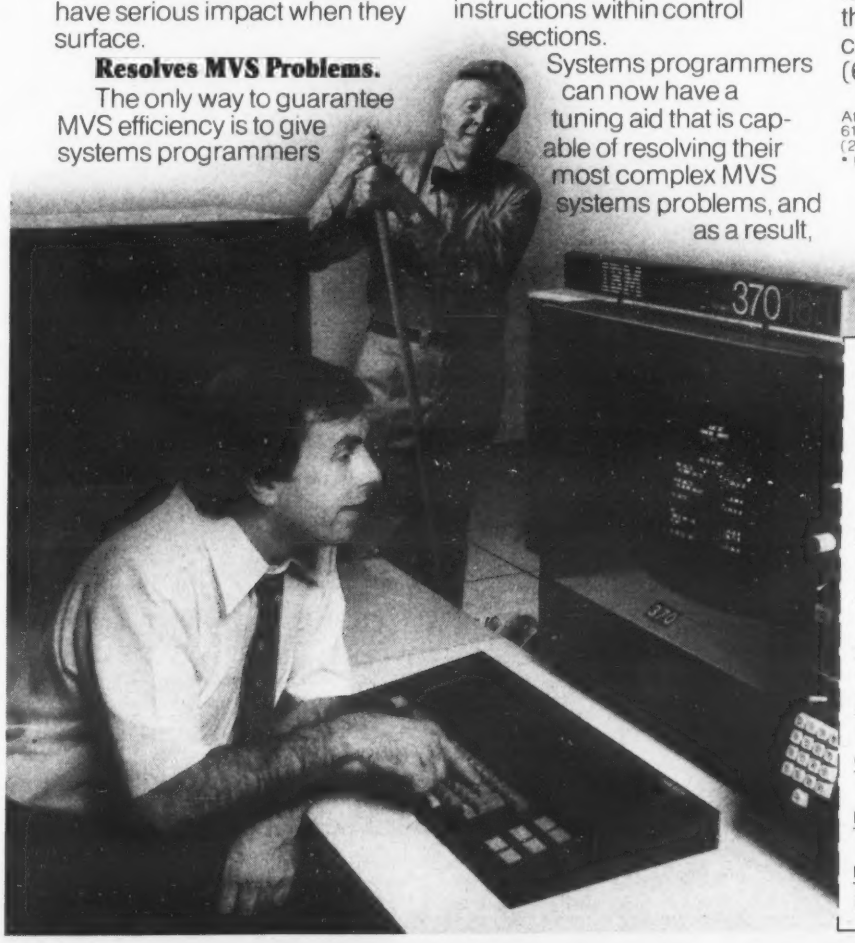

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To Monitor Federal Contractors

MIS at Labor to Track Firms' EEO Compliance

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — As a result of the President's federal reorganization efforts, the government is turning to increased automation to streamline its Equal Employment Opportunity (EEO) programs.

Reorganization of these programs was announced by President Carter last February. Since then, the Office of Federal Contract Compliance Programs (OFCCP), in the Labor Department's Employment Standards Administration, has assumed total responsibility for all federal contract compliance activity.

OFCCP, which became operational early this month, is currently developing plans for a large management information system (MIS) that will track federal contractor compliance with the various EEO laws, the Labor Department said.

The contract compliance effort, once scattered among 11 federal agencies, did not have a "comprehensive or coherent data system . . . because it was so fragmented," according to David E. Wilkinson, chief, Branch of DP Programs, OFCCP.

The OFCCP MIS will compile statistical information on EEO and Affirmative Action programs among federal contractors and enable the government "to target specific contractors for review," Wilkinson said.

Some 30,000 Contractors

Some 30,000 prime contractors and thousands more subcontractors, including most major corporations in the country, are covered by federal laws prohibiting employment discrimination on the basis of race, sex, color, religion, national origin, handicap or veterans status, according to Labor Department figures.

Affirmative Action is also an integral part of the requirements of these contractors.

The OFCCP MIS is expected to be operational in about 30 months, according to Wilkinson, who is overseeing the system's development. In the meantime, he said, OFCCP is using or developing three interim systems.

One system, the Automated Contractor Employment Compliance System, has been operational for several years in the Department of Defense, which now runs the system for OFCCP, he said.

That system monitors contractor compliance with the various EEO and Affirmative Action requirements of the federal government.

Correspondence Control System

Second, Wilkinson said, OFCCP has just implemented a Correspondence Control System (CCS) developed by Optimum Systems, Inc. (OSI) of Rockville, MD.

CCS monitors and tracks incoming correspondence and other items "such as show cause orders, sanction actions and consent decrees," according to the system's Labor Department description.

CCS is a remote-batch system with limited on-line query capability, Wilkinson said. OSI operates the system through a General Services Administration Teleprocessing Services Program (TSP) contract, he added.

The third system, recently developed for OFCCP by Information Planning Associates, Inc. (IPA), a Gaithersburg, Md., minority-owned firm, is called the Complaint Administration System (CAS).

According to its OFCCP description, CAS is designed to "monitor progress in processing complaints and current status of all outstanding complaints in order to produce various output reports to meet management needs and to satisfy requirements for court-ordered reporting."

The system will be implemented in the first quarter of next year, Wilkinson said. It might be merged with the correspondence system and run by OSI, or IPA or the National Institutes of Health Computer Center might be chosen to operate it on a contract basis, he said.

MIS Takeover

Eventually, the three systems will be discontinued and their functions taken over by the comprehensive OFCCP MIS, according to Wilkinson. Peat, Marwick, Mitchell & Co. is currently developing a detailed system design under an OFCCP contract.

The system design study should be completed by next March, Wilkinson said. That study will be the basis for a contract OFCCP will award for the final system.

The final systems, which will be "very large" and "very complex," according to Wilkinson, will provide "universal and comprehensive coverage of all data relative to compliance programs operations, contractor universe, contractor performance, federal procurement action, enforcement/litigation data, complaints and all aspects of the execution of [relevant federal laws], according to an OFCCP statement of purpose.

Wilkinson said the OFCCP MIS will not be operated in-house initially. The Labor Department, he explained, is currently upgrading its DP facilities.

The department will include the OFCCP requirements in its upgrade planning, and eventually the OFCCP MIS will be operated in-house, he said. Until that ability is established, several years from now, the system will be operated by an outside contractor on a competitive basis, according to Wilkinson.

Coming System Seen Boon To EEO Data Collection

WASHINGTON, D.C. — Lack of adequate, accurate data has been a major stumbling block in the government's efforts to enforce Equal Employment Opportunity (EEO) and Affirmative Action laws, according to David E. Wilkinson of the Labor Department's Office of Federal Contract Compliance Programs (OFCCP).

The management information system OFCCP is developing will go a long way toward remedying the problem, he said.

Along with the automated system, OFCCP is in the process of establishing 60 field offices that will be connected on-line to the OFCCP MIS, he said. These offices will provide statistical data and conduct on-site reviews of federal contractors to determine compliance with EEO laws.

The system will help OFCCP target contractors for review, he explained, noting that because the Labor Department has the manpower to review only about 5% of government contractors a year, there is a need to better identify potential violators of federal law.

Efforts Maximized

There is no point in checking up on or "harassing" the contractor who is in compliance with EEO laws, he said, and as data is made available through the system over a period of time, the MIS will allow OFCCP to "maximize our efforts."

He stated that OFCCP administrators are "very serious about this program." The EEO program has really not worked very well, he said, because it was too fragmented and did not have access to accurate data.

"The universe of contractors is very large; the universe of contracting is even larger," Wilkinson said, adding that no one in the government even knows how may government contractors there are.

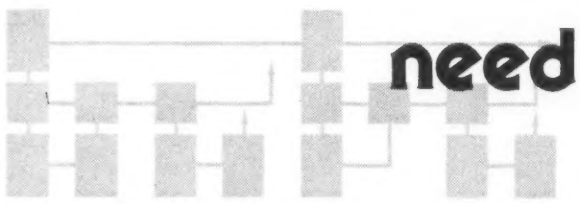
OMB System

The Office of Management and Budget is developing an automated system to track government contracting activities, he said, adding that the system will be operational some time next year.

As an indication of the acute lack of data in this area, Wilkinson said one company OFCCP had considered for one of its systems development contracts had already been found by the government to be in noncompliance with EEO laws. The company paid higher salaries to men than to women doing comparable work, he said.

Consolidation of the federal contract compliance programs and development of the OFCCP MIS are indications the Carter Administration is trying to get a program together that can be competently and effectively administered, Wilkinson said.

"Now we have a chance, with it being consolidated, to actually make it work," he said.



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Physical Handicaps No Obstacle to DPers

By Howard A. Karten
CW Staff

ATLANTA — Programmers who are physically handicapped can achieve the same level of effectiveness as non-handicapped programmers, according to Nancy A. Flood of Virginia's Department of Vocational Rehabilitation.

Speaking at a session entitled "Rehabilitation of the Handicapped as Productive Programmers" at the Americas Univac Users Association (AUUA) meeting here last week, Flood said it is important for companies to realize that successful employment of handicapped programmers and analysts is possible with only minor adjustments.

CW at AUUA

According to Flood, one of her key problems is getting potential employers "not to look at her as if she were crazy" when she visits them and suggests hiring the handicapped people she has trained in the field.

Explaining that those she trained are neither supermen nor sinners, Flood suggested "they [should] have the same right to fail or do dumb things as anyone else. They're really just like normal human beings" except for their physical handicap, which is really a minor factor in their working abilities.

Emphasizing this point, Flood recounted how two of her students working as a team won a rifle contest in a recreation program. "One was a C-2 quadriplegic (paralyzed from the neck down) and the other was blind. They figured between them they had the same abilities as a nonhandicapped person; the blind one aimed the weapon with instructions from the sighted one and then pulled the trigger," she explained.

Training Project

Flood runs the computer programmer training project for the Woodrow Wilson Rehabilitation Center of Virginia in Fishersville, which she described as the first comprehensive rehabilitation program in the country. Three factors combined to draw her into this program, she explained.

First of all, she had been working as a systems analyst and wanted to do less travelling. Second, an operation that confined her to a wheelchair for several months gave her some insight into the problems faced by the handicapped.

Finally, when an IBM employee became handicapped, the Commonwealth of Virginia and IBM started a program to train the handicapped. These factors coalesced and led her to her present position, where she has been for the past six years.

Describing her success rate in placing her program's graduates as "in excess of 95%," Flood said that larger DP shops and banks seemed the most receptive to the idea of employing handicapped people. "Larger shops don't seem to have as many problems or crises as smaller ones, and banks employ them for two reasons: it's good public relations and banks tend to be large users of DP equipment," she explained.

No Additional Expenses

Employers usually don't incur additional expenses in employing the handicapped in Virginia because the Commonwealth absorbs the cost of the extra equipment needed by the handicapped, Flood commented.

For example, the Commonwealth would pay for the cost of a typewriter only if the item were not in standard use there. If a typewriter is standard equipment, the state will pay for the cost of any necessary modifications to the typewriter — such as a motor-driven reverse indexing feature — but not for the typewriter itself, she explained.

Citing the cases of some students who had "attitude problems" that interfered with their adjustment to a work environment, Flood asked that the graduates of her 12-month program not be regarded as superwomen or supermen.

Despite this, she added, they do have some abilities that the nonhandicapped person may lack. "They could just sit at home and [legally] collect Social Security, but they're motivated enough to want to work. They have often had to rely heavily on logic to make their lives easier, which prepares them for work in DP."

Although a few of her trainees are so severely handicapped that they cannot go into an office, most try and are successful at working in an office environment.

Noting that problems that arise when employing handicapped workers can usually be solved, Flood mentioned one of her trainees who hired as a personal attendant someone who worked in the same company. The two commuted to and from work together and also roomed together.

Flood's program runs for 12 months, with the last six weeks devoted to producing a live system.

Study Coordinator Outlines Troubles

Government Seen Unprepared for DP Future

By Howard A. Karten
CW Staff

ATLANTA — The federal government is generally mismanaging its information technology resources and has not developed a plan for exploiting the technological opportunities of the future.

That was one of the observations made by A. P. Jensen of the Georgia Institute of Technology at the Americas Univac Users Association (AUUA) meeting here last week. A coordinator of the President's DP reorganization project, Jensen addressed a session on federal reorganization, policies and regulations.

He claimed that mismanagement exists despite the fact that the federal government is "irreversibly and increasingly committed to the use of information technology to manage its resources, provide its services and protect its citizens."

Jensen, who was previously involved in a similar reorganization effort for Carter when he was governor of Georgia, maintained that despite organizational problems, government DP workers are "intent on doing the right thing in the right way" and are unfairly maligned.

Summarizing his findings for the seemingly unsurprised audience, Jensen said the present condition of the government with respect to DP activities and policies will not improve without a major change in attitude towards information technology. "A systematic and integrated effort will be required to bring about needed change," he added.

Jensen said his group used the term "information technology" to mean the "confluence of computers and communications."

One thing the government must do to straighten out its organizational woes is establish "clear and measurable criteria by which mission performance can be judged and then reward competence in order to build and strengthen it," he said.

This strengthening of competence is the major challenge government faces, Jensen continued.

In order to achieve these goals, an initial increase in budgets will be required, but ultimately the "momentum" established will allow government to save money, Jensen claimed.

Jensen outlined his group's recommendations as follows:

- The government should take action to establish the importance of information technology, provide tools for its management and serve national goals.
- The government should expand the use of DP technology to achieve its goals and reduce the cost of government services.
- The OMB should establish policies requiring that DP costs be charged back to the agencies and programs incurring those costs.
- All DP equipment that has outlived its useful cost-effective life should be phased out.
- The government should significantly improve the process of acquiring DP equipment and services by placing more emphasis on planning, needs definition and cost justification.

"Now, if a high-technology agency wants to procure a $50 million piece of instrumentation, it can do so with less effort than it takes to acquire a $5 million computer which would be an integral part of the use and productivity of that body of instrumentation," Jensen noted.

- The government must upgrade the training and career development required for functional managers, reclassify personnel skilled in the management and use of information technology and establish career paths for such persons.
- Program and mission agencies must strengthen managerial and technical expertise in information technology.
- The government must institute a program in information technology to meet the needs of the nondefense sector.
- The government should revitalize efforts to establish and maintain a standards program for information technology in order to support the economical purchase and operation of equipment.

CW at AUUA

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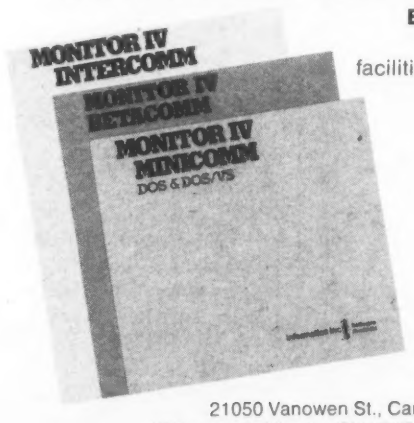

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Will Systems Chiefs Be Presidents Some Day?

By Brad Schultz
CW Staff

CHICAGO — Are the information systems managers of today the corporate presidents of tomorrow?

Maybe so, a large company's executive vice-president told a session on "New Opportunities for the DP Manager" at the Information Management Exposition & Conference here recently. But it is also becoming more difficult to manage information systems well, which may mean it will be more difficult for most data chiefs to enter the corporate ranks, he noted.

Systems managers are already participating in corporate strategy planning, Kraft, Inc.'s William E. Reidy said. In the current fifth age of systems management, the chiefs primarily supervise company resources in the sense that a controller supervises the firm's money.

Accordingly, the systems manager must understand why and how his firm exists, including the changing nature of the industry it serves and the interpersonal relationships of its other managers, Reidy said. Therefore, he must possess strengths beyond mere technical expertise to survive — strengths supposedly honed to perfection in a good chief executive.

Through the Ages

During the first age of systems management, prior to the advent of general-purpose digital computer systems, the systems manager was really a clerical supervisor in change of tabulating equipment. His background was essentially in accounting and he had some machine experience, Reidy explained.

The early CPUs introduced the second age, which entailed a much greater company investment in systems equipment than in personnel. Perhaps one programmer was placed under the systems chief, who was now more solidly into electronics.

The third age systems chief, typically in charge of IBM 1401 and 7000 series CPUs, was a "paper pusher" who reported to the company controller and was for the first time invited to participate in financial decision making, Reidy continued.

The third age chief encountered problems that other manager types had experienced earlier in their careers, such as rapid personnel turnover.

IBM's 360 series mainframes ushered in the fourth age during the mid-1960s, broadening the size of systems staffs and extending the scopes of their involvement in company matters. The fourth-generation systems chief handled multiple shift operations and was organizationally seen as a director — with managers reporting to him, Reidy said.

The fourth generation chief became involved in corporate-level politics, especially as "a cloud developed over many installations because of unfulfilled DP promises, Reidy asserted.

The fourth generation systems manager could not benefit from professional training programs addressed to the true nature of his responsibilities and begin to correspond with other systems managers in a spirit of professional affiliation, he added.

But the fifth age manager does have access to professional training programs and formal societies of his peers. The top systems chiefs of this current age handle communications and DP resources for their firms, often at the vide-president level.

The next step in promotion for current systems vice-presidents was identified as the senior or executive vice-president in charge of operations or technical services. At this stage, they are at the president's "right hand."

Reidy seemed to draw a distinction between DP and systems management, indicating the latter is one category of business administration while the former is more restricted to technology.

Managers Told

Graphics Systems Worth Initial Pains

By Tim Scannell
CW Staff

CHICAGO — Now that managers and corporate executives have successfully increased their ability to bombard one another with reams of information, the greatest difficulty lies in making sense out of the information fallout, according to Bruce Rodgers, market development manager for Tektronix, Inc.

Rodgers was one of three panelists at the recent Information Management Exposition and Conference (Info'78) here who discussed the techniques and problems associated with interactive graphics systems.

Most business managers must undergo a trial by fire and cross over a "pain threshold" before achieving the final reward of an operable interactive graphics system, Rodgers explained. In order to come out ahead, they must be willing and able to take the time to learn to use the computer.

A universal problem with any DP system, and particularly a graphics system, is that I/O devices or peripherals are basically "unfriendly." Compatibility and transfer gliches are common with new systems, Rodgers said, and up until now hardware vendors never went out of their way to make products "easier to use."

Graphics representations, he continued, are also terribly unexciting to the untrained eye of the average user. However, the world of bar charts and pie graphs, when fully understood, can be "incredibly informing."

Necessary Fixtures

There are several economical as well as fundamental reasons why graphics displays should be necessary fixtures in the corporate household. One of these reasons, according to Mabel Hoffman, a unit manager with Chicago's First National Bank, is to avoid "management redundancy."

Hoffman, also a member of the panel, detailed the considerations and step-by-step procedures her employer took in implementing an interactive graphics systems. Labeled the Executive Information System (EIS), the First National Bank's financial analysis package was designed as a general utility that could be used in several "number-manipulating" applications.

The system not only provided management with information, but supplied a means of distinguishing between everyday data and time-sensitive information, Hoffman stated.

The bank's six-person, full-time staff assigned to the graphics project first had to identify exactly what kind of data was used by the management departments and where it originated — internal, external or private files. Next, the graphics team had to examine management's "analytical process" or detail just how decisions were made within the corporate sanctuary.

The team discovered that management was more interested in the direction and effects of decisions than in decisions themselves, Hoffman continued. Trends, changes and financial comparisons, as well as the frequency of changes of the data, were given the most consideration in the development of the final system.

Management and employees, considered the presence of a time series data base, a built-in analytical capability and a color graphics feature necessary to aid in the financial comparisons. A menu selection type of system controlled by a light pen and requiring no previous user knowledge or command of programming language was also chosen.

Multipurpose System

The end result of "more than a couple of years" of development was the bank's management-oriented DP facility, a multipurpose system that is currently marketed by IBM (a codeveloper) as the Trend Analysis/370 package.

To date, the system has been used by the First National Bank for retail market share analysis, automatic teller usage, interest rate tracking, credit and loan analysis, credit card billing analysis and liability information functions, as well as for standard financial procedures.

Finally, Lawrence Bruckner, a member of the technical staff at the Los Alamos Scientific Laboratory in Los Alamos, N.M., offered a different and somewhat entertaining view of the cut-and-dried world of graphics representations. Bruckner proposed using identifiable forms such as a series of "faces" or trucks in varying sizes rather than the conventional bar, pie or line graphs.

The faces, devised by Herman Chernoff of MIT, are broken down into 20 different variables such as nose length, eye slant, ear position and so on. These variable possibilities are then matched with the variables of a group of corporations so that increased revenues might mean a longer nose, for instance, or exependitures might generate a particular head size, Bruckner explained.

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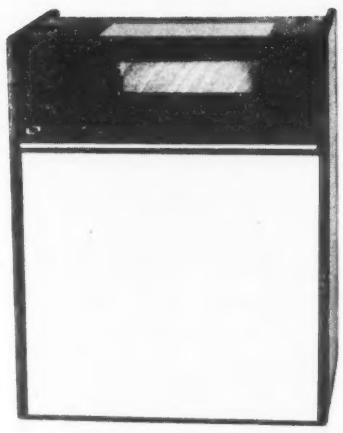

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Consultant Cautions

Minis Can Put Hex on Small Business Users

By Tim Scannell
CW Staff

CHICAGO — Most of today's small business minicomputer systems are "unsuccessful" in the hands of the average user and lead to "anguish, agony and a great deal of midnight oil."

That rather dismal view of minicomputer system operations was expressed here at the recent Information Management Exposition & Conference (Info '78) by John Morris of Morris Consulting.

The biggest threat to the average user searching for the best minicomputer system is the salesman, who is traditionally less than honest and whose claims "border on science fiction," Morris said. Too many salesmen and DP afficionadoes promote the mystique and "mumbo-jumbo" of DP and fail to convey that computers are not magic and will not solve great problems.

Speaking to an audience made up of approximately 5% programmers, 15% DP managers and more than 60% controllers and account executives, Morris envisioned the day when "every business and maybe every home would have a small computer doing something."

However, before the executive or even the homemaker rushes to computerize, the potential user must decide what should and should not be automated, Morris remarked.

A Number of Considerations

How often a certain job occurs should be a primary consideration because repetition is what a computer does best, the consultant explained. Storage requirements, processing time, program complexity and the condition of the user's environment should follow in importance.

Operating systems should also be carefully considered by the small business user because many systems require a great deal of memory, sometimes more than half, leaving the user with very little to run necessary programs. The company's storage requirements, or how long the records must be kept, are also an important aspect in system selection, according to Morris.

Programming is probably the most important facet of the entire system, Morris said, because languages and coding will have an impact on "how long, quick and well" a person will be able to do his job. "When a programmer is good, he's very, very good," the consultant noted, "but when he's bad, he's horrid."

Coding techniques virtually dictate the way an entire file or system is built and can result in either system efficiency or wasted time. The programmer, therefore, should strive for perfection rather than speed and not use the machine as a crutch to catch all his mistakes, Morris warned.

Software packages and offerings should be considered before hardware luxuries, he added. The user has to decide between custom packages, utilities, applications, complete systems and combinations. "Developing a good package will usually cost more than a single-priced system," Morris pointed out.

Equipment Alternatives

A vast array of equipment alternatives are available. The neophyte tries to "do everything on a computer," Morris said. However, he should formulate job priorities.

After evaluating his needs, the user can choose from an accounting machine, personal computer, minicomputer, service bureau or "classical" DP, Morris said.

The user, by this time totally confused, has several supply avenues open. Major manufacturers will usually supply the hardware but leave the software to the user or some outside service. And distributors are the "car dealers" or fast-food merchants of the computer industry, interested in sales rather than down-the-road user satisfaction, Morris said.

The best channel to tap for system satisfaction, he suggested, is the system houses that offer "turnkey" software/hardware packages and "do the entire job."

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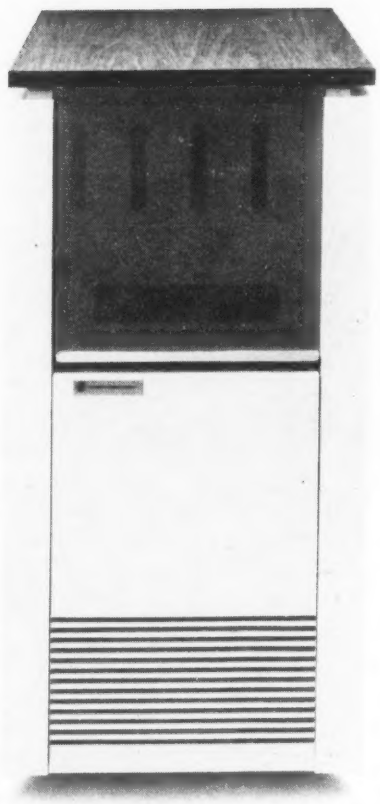

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Report Warns 'Hot Button' Contract Burns User

By Brad Schultz
CW Staff

WINTER PARK, Fla. — When negotiations for a DP procurement encounter last-minute financial or legal snags, the vendor can panic the user's DP staff into forcing top management to approve the deal. In the long run, a purchase made under such circumstances frequently proves unjustified both in performance and economic terms, according to a recent article in *CNReport*.

This vendor strategy involves persuading the DP staff that products encompassed by the sale satisfy its basic DP needs, such as increased processing capacity, the reduction of certain costs or the solution of a particular applications problem, the newsletter said.

Although the capabilities of these products may be desirable from a performance standpoint, they may not actually be needed, according to the article. One of the vendor representatives' tactics is to establish the promised benefits as needs in the user's mind.

After winning the DP staff's approval, the proposal can gather momentum and authenticity as it travels up the user chain of command, the article indicated. Advantages originally claimed by the vendor tend to be paraphrased and adopted by staff and management personnel at each level.

These people tend to avoid doing the homework necessary for proper evaluation and are thus biased by bad input from lower echelons, the report maintained.

According to the scenario, something goes wrong just after the decision to proceed with the deal is reached. This could be sudden detection of a legal loophole or unexpected trouble gathering funds for the purchase, the article indicated.

Scrambling to solidify the transaction, the vendor intensifies the climate of urgency by "pressing" the DP staff's "hot buttons": convincing it that dire needs will go unmet unless matters are promptly resolved.

The original proposal then undergoes hasty revision: "Equipment may be swapped out. Services may be added. Lease or rental terms may be lengthened or shortened. And a wide variety of hard or soft dollar concessions may be renegotiated or juggled," the article warned.

If the DPers have sufficient clout with their organization's top management, they may force unwise acceptance of the deal, the article pointed out. "This stage can be particularly frustrating for the user's professional legal and financial advisors" who "recognize the risks and problems of proceeding with haste and confusion," it added.

The benefits promised by the vendor often fail to materialize, *CNReport* maintained. For example, the agreement may allow relatively inexpensive use of certain hardware — on a temporary basis — to allow software conversion to a new CPU, but the user may discover the hardware will be required after the conversion at considerable additional cost.

Another possibility is that the user may agree to terms by which a large set of peripheral equipment is financed at an attractive rate over a period of several years. But this may prove seriously restrictive, compelling dependence on the original mainframe when other vendors introduce more appropriate systems, as well as limiting the scope of possible applications development.

Avert the Ploy

To avert the "hot button" ploy, the user should establish an active planning department so the vendor does not become the user's planning arm, *CNReport* advised. "A truly independent, qualified user planning team is less likely to believe a vendor proposal that is overflowing with blue sky promises."

In addition, the user should financially analyze all aspects of each vendor proposal. "Verify any and all vendor representations," the article said, and "when relying upon verifications supposedly conducted by subordinate user staff, ask enough questions to ensure that adequate procedures have been followed.

The article also recommended that all equipment lists be carefully documented and cross-verified. "When equipment configurations or soft dollar concessions are modified for any reason during the negotiating process, the vendor's initial 'savings' promises should be reanalyzed and reconfirmed before the agreement is signed."

Finally, "do not fall for the popular vendor ploys that create a false sense of urgency . . . Relax. Anayze and document each proposal with care, from performance specifications through financial and legal considerations."

CNReport is published monthly by International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

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System Gives Doctors On-Line Access to Data

By Marguerite Zientara
CW Staff

BETHESDA, Md. — By pushing a few buttons, doctors with lots of questions and little time can access a wealth of on-line biomedical bibliographical information maintained by the National Library of Medicine (NLM) of the National Institutes of Health.

The seven-year-old system, accessible over direct-dial telephone lines or through Tymnet or Telenet, produces more than 2,000 "hits" each day, according to Sheila Proudman, technical information specialist at NLM.

The system serves about 1,000 medical institutions nationwide, with a very small number of terminals in private physicians' offices, Proudman said.

The system's main and most popular file is the Medline system, an on-line version of NLM's monthly publication *Index Medicus*, which is a reader's guide to periodical literature in medical journals, Proudman explained.

Also on-line in the system is Catline, a catalog of the library's books, Serline, a catalog of the library's serials, and A-V Line, a guide to the library's audio-visual materials, according to Proudman.

Three files are available in conjunction with the National Cancer Institute (NCI), Proudman said.

The first, a bibliographic file, cotains references to cancer-related journal literature, such as technical reports, monographs, journals and meeting proceedings.

Another NCI file available through NLM, Cancer Proj, holds the Smithsonian Institution's file of government-funded cancer research projects.

The third cancer file, called Clinprot ("clinical protocols"), has information on clinical trials of drug combinations for cancer therapy, Proudman said.

He explained that although most of the files are bibliographic, the Smithsonian file gives users abstracts of what each researcher is doing and the Clinprot file contains information on the drugs used, dosages given and results.

Another system file is Epilepsy Line, a portion of *Excerpta Medica*, a hard-copy private publication of bibliographical information on epilepsy.

Toxline contains bibliographical information on toxicity obtained by NLM from 10 secondary sources. Whereas *Index Medicus* is indexed by personnel at NLM, Toxline makes use of abstracting services in the pesticide and toxicity information field, Proudman said.

Another file, Rtecs, is an on-line listing of several thousand toxic chemicals put together by the National Institute of Occupational Safety and Health and issued yearly in book form, he noted.

The Rtecs file differs from the rest in that it gives an actual computation as opposed to a bibliographical citation, according to Proudman. For instance, a user could input "rat, oral, lethal dose 50" and the chemical's name, and the system would furnish the number of milligrams of the substance it would take to kill 50 rats.

As the key to all this information, there is a computer-aided instruction package to teach the user how to access the Medline system. A similar package is being written for Toxline.

Both contain the basics of on-line interaction as well as specific information on accessing each of those two files, Proudman explained.

File updates take place anywhere from monthly to quarterly, he said, depending on the file.

On-Line Since '71

Medline became generally available in 1971, with the other files coming on-line later.

It is basically a mediated system, with most of the terminals located in libraries, Proudman said. A physician or researcher who wants to access the system can go to his library and put in a request to the librarian or information specialist there, who will do the actual inputting and retrieval.

Most termainals are in medical libraries, with a large percentage in pharmaceutical and chemical companies as well. These firms primarily use the system's toxicology and cancer files, Proudman noted.

In response to a request for information, the user could get thousands of items of information or just a handful, she said, and noted that NLM prints out about 2,000 searches per day. That figure does not reflect the total number of searches made, however, because users can print out accessed information at their own terminals without a record being made at NLM.

The system runs on two IBM 370/158s, one in Bethesda, Md., and the other at the State University of New York computer center in Albany. Albany's system has 5M bytes of main memory and Bethesda's four million characters of main memory as well as more than 10 billion characters of direct access storage, Proudman said.

The system's subscribers use a variety of terminals operating at 300- or 1,200 bit/sec, he said.

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Cruising Minis Help Snag Delinquent Drivers

By Marcy Rosenberg
CW Staff

BALTIMORE — People who drive with suspended or revoked licenses may soon hit a new roadblock — police patrol cars equipped with minicomputers that can rapidly screen a data base and identify a license place associated with various legal offenses.

This computer application was part of a four-year-old project developed by the Insurance Institute for Highway Safety (IIHS) in Washington, D.C., and implemented in cooperation with the Maryland Department of Motor Vehicles and Maryland State Police.

Code named Tags, the project was carried out in two parts.

In the first phase, a Hewlett-Packard Co. 2100 system, which stored a data base of offender license tag numbers on a disk file, was installed in a cruising van. If the operator keyed in a license plate number spotted on the road that matched one in the data base, the computer supplied a description of the vehicle and driver and the type of violation.

The operator could then radio this information, along with the vehicle's location, to a marked patrol car in the area to take appropriate action.

Police, Civilian Team

To make the screening method more efficient, the participating organizations decided to install computers in the patrol cars. Each car was manned by a civilian operator and police officer.

For this second phase of the project, IIHS chose to have specialized computer screening equipment developed for it because it found none commercially available that had the appropriate technical characteristics and could operate reliably in a police car where it would be jostled and could heat up when the car was parked, according to A. Eugene Miller, IIHS vice-president of operations.

"We required mass storage for about 100,000 license tag numbers, each with about six alphanumeric characters, and for appropriate descripter data including driver age, sex and race," he noted. "Excluding descripter data, this would take up about 3-1/2 million bits of storage.

"In addition, we needed a one-second system response time from entry of license tag number to determination of whether a match occurred," he added.

The minicomputers, or "special-purpose query devices," as Miller prefers to call them, used in the second phase were built to IIHS performance specs by Prototypes, Inc. of Kensington, Md., which builds prototypes of electronic equipment as part of its business. The systems are not commercially available, Miller said.

The hard-wired systems consist of a mass electronic recirculating memory on a cassette tape with special-purpose manipulator and control units to analyze data from the memory and control the tape cartridge. A Qantex, Inc. reader reads in the cartridge.

This hardware was installed in the trunk of the police car. Mounted on the passenger side was a small CRT screen of alphanumeric characters and a console keyboard serving as the terminal to the computer system in the trunk.

Data Base

The Tags Cobol tape data base combined information provided by a Control Data Corp. CDC 3500 dual computer system at the State Motor Vehicle Administration with data from a dual IBM 370/145 system at the data center of the Maryland Department of Public Safety and Correctional Services, the DP support for the Maryland State Police.

Motor Vehicle Administration data included suspended, revoked, cancelled or refused license tag numbers, while the police department provided license numbers of stolen cars and of individuals who violated safety equipment repair orders.

To accommodate the Phase 2 systems, a Data General Corp. Nova 2/10 at the police data center compressed the data to between one million and 1.5 million bits of fast access memory and converted it via a Qantex read/write unit from the disk file format used on the HP 2100 to a magnetic tape cartridge, Miller said.

Four beeps from the police car "terminal" signalled a match between an observed license plate number to one in the data base and a single beep indicated no match. Lights showed the type of violation.

According to an IIHS project summary report, the computerized mass screening process produced 13 times as many citations for driving with suspended or revoked licenses per 100 man-hours as were produced by the normal Maryland State Police mode of operation.

The Tags project has been temporarily suspended because of a lack of funds and police manpower resources, according to Robert L. Burkhardt, management information services representative for the Maryland Department of Transportation and project coordinator for the Motor Vehicle Administration.

"We may reinstitute the project to concentrate more on stolen cars," Burkhardt noted.

Audit Meet To Feature DP Topics

MIAMI BEACH, Fla. — The fourth annual Internal Auditing State of the Art Conference, scheduled for Dec. 4-6 here, will feature "the latest techniques, ideas and information" on the subject, according to its sponsor, the Institute of Internal Auditors (IIA).

DP will be discussed in such sessions as "Control Characteristics of On-Line Systems," "Implementing an EDP Auditing Process" and "Information Privacy and Data Security."

The program will also include industry group discussions and idea exchange sessions.

The fee is $295 for IIA members and $330 for nonmembers. IIA is at 249 Maitland Ave., Altamonte Springs, Fla. 32701.

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Predictions Can Miss Mark

Capacity Planning Seen Vexing DP Managers

By Howard A. Karten
CW Staff

CHICAGO — Many DP managers feel that capacity planning is a significant stumbling block for them and that they are losing credibility with upper management over the issue, according to Dr. Leeroy Bronner of IBM.

Speaking at a session entitled "Capacity Planning — A Necessary Component of DP Management" at a recent conference here, Bronner said that in his work at IBM's Federal Systems Center in Gaithersburg, Md., managers encounter problems with capacity planning. The consistent misses they record cause upper management to look at them askance.

While acknowledging that capacity planning is difficult, Bronner seemed to indicate that diligent and knowledgeable work can at least help to overcome inherent problems.

Basic Functions

The basic functions of capacity planning, Bronner noted, are establishing desired performance levels, identifying system bottlenecks, setting user service objectives, predicting and forecasting for the future and reporting pertinent data.

Although interest in capacity planning has revived lately, the subject is not new, Bronner observed. Rather, it is simply part of installation management and intersects with the handling of data bases, networks and equipment as well as the management of change, problems and performance.

Two important components of planning are the prediction process and system capacity itself. The prediction process requires a projected workload and an understanding of the loading scenario. Using a capacity planning method, new equipment requirement dates can be estimated, Bronner observed.

Three elements of capacity planning are workload characterization, system availability and system capacity, Bronner continued. System capacity is a function of several things, including resource utilization, actual workload, user service requirements (including response time and turnaround time) and capacity considerations in terms of CPU resources.

System availability, by contrast, has three major components, Bronner remarked. These are the hardware, the software and, most importantly, the user's perception of the system and its capabilities.

Workload characterization also is a process with several steps, according to Bronner. These include establishing CPU consumption of resources, broken down by subsystem (e.g. on-line, interactive or batch); identifying critical applications within each subsystem; distinguishing dominant activities; noting transaction volumes; and identifying peak transaction periods. It is important to have a profile of the entire workload to avoid getting a distorted one based on too small a sample. For example, if the workload peaks at the end of the month, a good representation will illustrate that part of the month, in addition to lighter days.

Users must realize available capacity depends on workload, the required resources for the workload and the interaction of these resources.

Several Useful Tools

There are several tools useful in capacity planning, Bronner told the audience. In order of increasing complexity, these are rules of thumb, linear projection, queuing models, discrete simulation, a systematic benchmark, network simulation and a full-scale benchmark. However, users should not get bogged down in the complexities of a full benchmark, Bronner cautioned.

Users should also realize capacity planning is a continuous, ongoing cycle, requiring feedback to improve the process. There are three steps in the cycle: data collection and reporting, comparisons of predicted and actual performance and performance analysis. Afterward, the process repeats itself.

In addition, capacity planning must be involved with organizational structure and office politics, Bronner said, because a capacity planning group, particularly if it is separate from existing functions, is often in conflict with preexisting experts.

Furthermore, coordination is needed among the operations department, the applications and the systems programming groups and the users themselves.

Responding to a question, Bronner said computer models to do capacity planning are still far off. Part of the problem is the scarcity of information on the topic, he noted.

UCLA Offers DP Training To People Already Working

LOS ANGELES — A computer science certification program designed to help working people with some background in mathematics or natural science enter the computing field has been established by the University of California at Los Angeles (UCLA).

UCLA's extension program, in a cooperative effort with the computer science department, has aimed this evening program at people who want formal training in computing without changing their current daytime working schedules.

By gaining DP skills for the first time or building on expertise already acquired, enrollees can achieve a Certificate in Computer Science; six required courses and two electives must be completed.

The required core courses cover programming languages, operating systems, compiler construction and machine organization and operation, a UCLA spokeswoman stated.

Electives are said to include "Applied Numerical Computing," "On-Line Computer Systems," "Computer System Architecture," "Simulation and Models," "Introduction to Pattern Recognition" and "Computer Networks."

Alternative for 'Disenchanted'

The university spokeswoman indicated the program is primarily intended to help the many "underutilized, underemployed and disenchanted" people trained in the 1960s to serve the then-booming aerospace industry.

"In those heady days of the space program, math students were recruited and student loans forgiven for those who went on to teach," the spokeswoman explained. "But demand for mathematicians waned after the early days of the space program ... Math teacher recruitments plummeted." The computer software field offered an alternative for these people.

Many who receive their certificate are expected to go on to a master's or Ph.D. program in computer science, another UCLA spokeswoman stated.

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'Epilog' Only Real Debut at European Meet

By Don Leavitt
CW Staff

LONDON — Like many other professional organizations, the European Computer Measurement Association (Ecoma) rules out direct sales efforts but permits technical presentations of products by vendors attending its periodic meetings. Ecoma-6, held here recently, included a number of such presentations.

Many of the vendors talked about computer performance measurement products that are familiar to the American scene but new to Europe. Only one session seemed to be the general introduction of a product: Candle Corp. of Marina Del Rey, Calif., used its time at the conference to announce the Epilog package as well as to introduce its Omegamon software monitor on this side of the Atlantic.

CW at Ecoma-6

Epilog was described as a new approach to performance management using a "background monitor." Reports generated by Epilog relate the wait time of tasks directly to the hardware or software causes of the waits. It can show, for example, that production batch jobs in the evening were delayed 125 minutes because of tape mounts.

But the report does more than report the gross time for each type of error, a spokesman noted. Epilog would show in the example cited just how much time was lost by each job because of the delays in tape mounts.

Unlike Candle, which said it expects to be established with both marketing and technical support here by year-end, most of the other vendors are already in place in Europe.

Tesdata Systems Corp., which used the Ecoma meeting to introduce several additions to its MS-88 hardware monitor, was joined by the European representatives of Value Computing, Inc., who discussed computacharge, another scheduling support, and by Boeing Computer Services, Inc., which emphasized the software physics-oriented measurements supported by its Sara package.

New to the European scene, Tesdata's MS-108 channel event monitor, its message display unit and the MS-88 extended facilities were originally announced at the National Computer Conference in Anaheim, Calif., last June.

The channel event monitor is said to recognize channel activity and selected events on-line so correlations, if any exist, can be seen between hardware and software measures.

The message display unit provides real-time messages to alert the operations staff to problems. Certain conditions, if prolonged, affect response or turnaround time — or both — and must be halted as soon as possible.

The display unit lights up an appropriate message whenever one of these conditions is sensed and adds an audible alarm just in case the operator fails to notice the message.

Underlying both of these enhancements are the MS-88 extended facilities, which provide the user with a single source of performance data, interrelated to specific objectives, a Tesdata spokesman said.

Value's English representatives, RTZ Computer Services Ltd., outlined the capabilities of the company's schedulers and claimed they are particularly useful because they attack the scheduling problem on a data centerwide basis, not machine by machine.

In another presentation, BGS Systems, Inc. demonstrated its Best/1 computer system modeling package after the company's vice-president, Dr. Jeffrey Buzen, completed a major invited dissertation on the concepts of modeling.

Still other vendor sessions highlighted Boole & Babbage, Inc.'s monitoring packages, a Fortran optimizing package from Capex Corp. and an update of the Harmonie Hardware monitor from TITN of France.

Ecoma Sees Future Success Dependent on Individuals

By Don Leavitt
CW Staff

LONDON — The success of the European Computer Measurement Association (Ecoma) is largely a result of "the support of the membership organizations," but the future will depend as much on the commitment of individual member delegates, according to the association's president.

Noting that some 270 delegates from about 200 organizations throughout Europe attended the sixth meeting of the group (Ecoma-6) at the Hotel Tara here earlier this month, performance analyst Scott N. Yasler of the Union Bank of Switzerland said he was very satisfied with the progress made by the two-and-a-half-year-old user association.

But it has been successful to a large degree, he contended, because of the organizations behind the delegates. Each organization pays 400 Swiss francs per year to belong to Ecoma, he explained, and that is enough to represent a fundamental commitment to the group.

With that much money committed to the cause, the organizations face only hotel and travel costs to send their people to the conferences. That sets up an atmosphere quite different from the U.S., where professional bodies tend to have individual memberships and interested people have to sell management on the value of their going to any given conference, Yasler said.

Ecoma itself is organized around nine working committees, each keyed to a special area of interest within computer performance evaluation (CPE). In addition to attracting users with special interests, these committees, through their chairmen, serve still another purpose, the president noted.

Each of the committee chairmen is from a separate country. Therefore, Yasler pointed out, a prospective member is likely to find someone from his own country on the association's letterhead and feel more comfortable about asking questions.

Ecoma-7 will be held a year from now in Paris. The location of the eighth meeting, in the fall of 1980, is still to be decided.

Although the meetings will be less frequent, Ecoma "delegates" and anyone else interested in CPE will be challenged in the very near future if plans for a "substantial" international journal — "probably a quarterly at least in the beginning" — come to fruition under Ecoma's aegis.

Yasler would like to get contributing editors from every country — "This effort is certainly not just limited to Europe," he emphasized — with the idea that these editors would be able to extract at least one article from their countrymen for each issue.

More information about Ecoma and the proposed journal is available from Yasler at Scheuchzerstrasse 5, CH-8006, Zurich, Switzerland.

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Bank Analyst Says

Modular Programs Yield Performance Benefits

By Don Leavitt
CW Staff

LONDON — A conference on computer measurement may seem a strange place to talk about the benefits of modular programming — and of generalized I/O modules in particular — but the Bank of Scotland has used just such approaches, and they do have performance implications, according to analyst Stewart Stevenson.

Addressing a session of the sixth meeting of the European Computer Measurement Association (Ecoma-6) in mid-October, Stevenson said the bank's experience with tailored I/O modules "over the past 10 years or so" had resolved some of the issues raised about its suppliers' hardware and software.

But, he warned, the effective use of generalized I/O modules depends on an installation's willingness to study and understand the environment available from the vendors.

Currently the bank is working with two 1M-byte IBM 370/158 (plus a 1M-byte 370/155-2 as a backup), 1419 Micr check reader/sorters, 400 IBM 3980 banking terminals and a number of Synchronous Data Link Control (SDLC) - oriented 3270 CRT terminals interfacing with the international banking network, Swift.

Modular Programming Introduced

When the bank moved to the IBM 360S in 1969, it introduced modular programming, enabling more programmers to work on one program, to "considerably" shorten compilation times and control testing and to tackle bigger, more complex developments, such as teleprocessing systems, Stevenson said.

Inevitably, he remarked, the introduction of modular programming led to the exchange of modules between projects and the growth of a body of general-purpose modules (GPM). To manage the use and development of GPM's most effectively, the bank's system programming group was made responsible for them.

There are now a very large number of GPMs "and they differ very little from those that should be in any programming shop." But their value, according to Stevenson, is perhaps best illustrated by the way some of the very early ones have been adapted to changes in the bank's operating environment, from DOS through OS/MFT to SVS.

The module that originally triggered job-timing statistics, for example, has been enhanced to ensure the statistics are collected even if the job ends abnormally. It also triggers automatic check-pointing and works with output to the computer output microfilm (COM) which the bank has now installed.

Expensive Annual Costs

While it is "clearly possible" to obtain productivity benefits in the programming shop through the use of GPMs, Stevenson said, it is also apparent that "some price" may have to be paid, especially in terms of computer resources.

He noted, for instance, that the bank generates "about eight million" lines of print on an average day. Moreover, the extra problem program CPU time used by the print GPM "as against a simple assembler alternative" is "about 16 minutes across all three CPUs." Thus, Stevenson said, the annual resource cost of that module is 67.2 CPU hours.

In utilizing nongeneral I/O modules for the majority of its nonprint I/O, however, the bank also incurs costs, he noted. There is a need, conservatively, for some 500 such modules each year. Each module takes about 16 man-hours to develop, so the annual cost is some 8,000 man-hours plus the maintenance effort required for these special modules.

CW at Ecoma-6

By comparison, use of the GPMs for printing and for reading "bypass the writing of nearly 400 modules a year." Use of the well-exercised modules generally causes no problems — which "cannot be said" for the special modules — so maintenance is also reduced.

Stevenson told his audience the bank invokes the GPMs through a CALL. This simplifies the interface and makes it possible to introduce an improved version of a GPM "whenever we wish, without the necessity to relink-edit every load module we possess."

"I believe the use of GPMs do the one important job that is allocated to them — to manage," he concluded.

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Editorial

On the Threshold

It was not too many years ago that packet switching was regarded as an experimental concept that evolved in research environments for exotic applications. But packet-switching technology has progressed at a rapid pace, and today it is very much a part of the communications options available to the business data communications user.

In the U.S., Telenet Communications Corp. and Tymnet, Inc. provide public data network facilities that use packet-switching methodology or, in one case, a modification of it. These services are somewhat unique in that they are offered by independent noncarrier firms. AT&T recently announced its Advanced Communications Service (ACS), which will include X.25 compatibility, making it compatible with networks now emerging in other countries.

The X.25 standard was finalized several years ago by the Consultative Committee on International Telephone and Telegraph. Its emergence marked a standards-making effort that progressed at breakneck speed compared with the length of time it usually takes for a standard to be finalized.

Last year's X.75 and X.121 standards paved the way for the interconnection of public packet data networks on an international basis. U.S. users can already access data bases in Canada using the facilities of Datapac and Telenet.

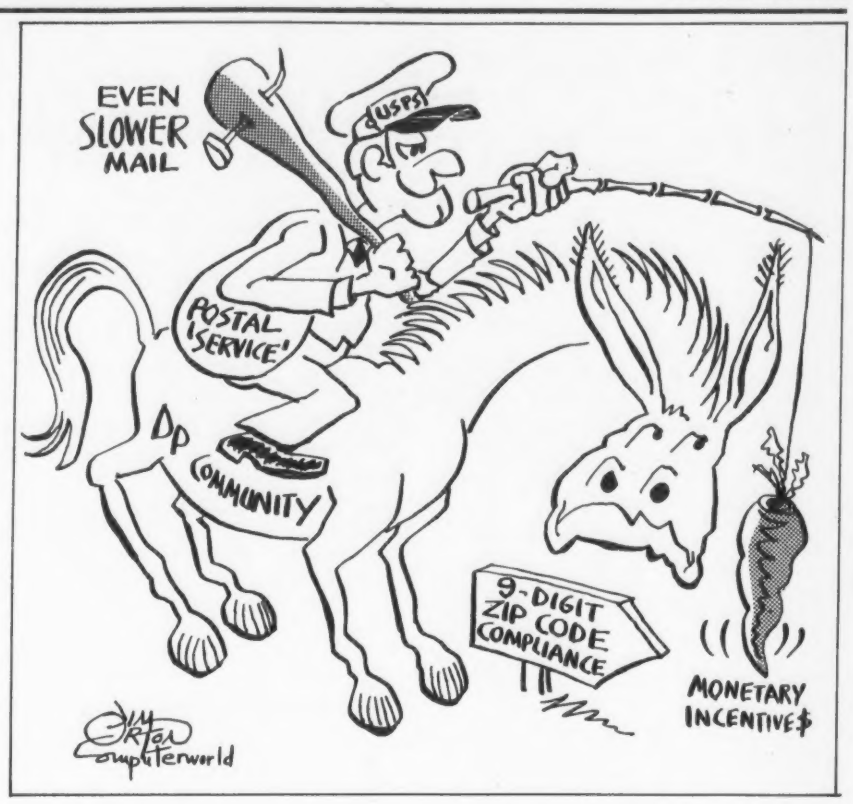
The stage has been set for true international communications. Along with this prospect has come concern for a host of societal issues, such as those considered at the recent International Conference on Computer Communication in Kyoto, Japan. These issues — personal privacy, security, data integrity and transborder data flow among them — are very real.

And there are still other problems to be solved, not the least of which is how the average user with a private-line, in-house network can take advantage of the public data nets. One solution may lie in the private packet networks now being configured by some large users.

It is still too early to predict the role that public packet nets will play to meet the communications needs of the average business user. It appears they will offer economical network facilities to smaller users which otherwise might not be able to afford an in-house data communications network.

The packet nets also hold great promise in the area of electronic mail. Unfortunately, this area is mired in regulatory and legal constraints that make a prediction of widespread use very questionable.

Nevertheless, packet networks have fulfilled their potential in a few short years. Users appear to be on the threshold of innovative services amid interconnected global networks.



Letters to the Editor

No Big Problem With Zip

I don't see a big problem with Zip Code conversion to nine or 12 digits. The primary hassles are determining the new digits (or letters?) and finding room in the master files and printout to put them.

To solve the first, the U.S. Postal Service has available at $1,000/year an IBM 360/370 Assembler program, Zipmatch, that converts mailing address to Zip Code at 100,000/hour with 85% success.

As for finding room in master files, I'm just going to put it where CITY used to be. If the Postal Service can deliver to buildings by the new Zip number, certainly spelling out the city for delivery instructions is archaic. I'll retain the five-digit Zip Code where it is for my existing programs, so no reprogramming will be involved.

My problem will be in converting out first class presorted mail package for the IBM System 32/34. With these extra four digits, the U.S. Postal Service will probably make the traying requirements for discount first class even more nefarious.

John Davenport
York, Pa.

Discussion at New Low

The continuing discussion on the utility of arbitration has apparently hit a new low. Surely there must be more meritorious arguments against arbitration than untrue statement about NCR Corp.'s program contracting policies. If Alan Taylor has to resort to those kinds of allegations to argue against arbitration, his position is indeed shallow [CW, Oct. 16].

We take particular exception to Taylor's statement that users of NCR Criterion computers are dependent on the company's good will and his characterization of imagined future actions by NCR as "chicanery."

Every user of software under the NCR Universal Agreement receives a license for a term (period of years, for as long as he uses the equipment, etc.) and upon certain payment provisions (included in the price, separate one-time charge, periodic payment, etc.).

Whatever the terms, it is an enforceable license. We have every confidence the arbitrator will respect it.

The Universal Agreement states very clearly (except possibly to Taylor) that upon resale, the customer can transfer the software if a second owner agrees to protect NCR's legitimate proprietary rights and trade secrets.

In actual fact, NCR's customers have a great deal more protection regarding software than most users. Their ability to resell equipment is not dependent on NCR's good will, but is guaranteed. Taylor's apparent belief that NCR would deliberately destroy its user base is ridiculous.

Taylor was wrong when he said courts interpret contracts to protect one party such as the customer. They interpret contracts to determine the intent of both parties. He was also wrong when he assumed that a mere allegation of fraud somehow will lead a court to disregard the provisions of a contract.

No one has ever maintained that arbitration is a panacea to either party. The danger in believing Taylor is that his comments might cause some users to conclude that courts are.

Ben E. Olive
Associate General Counsel

(Other letters on Page 23.)

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Data Past

Five Years Ago
Oct. 31, 1973

WASHINGTON, D.C. — Solicitor General Robert H. Bork was quoted as saying, "the government's suit [against IBM on antitrust grounds] stands revealed as an attack on outstanding commercial success as such." Bork was given the responsiblity for pursuing the IBM antitrust case in the wake of President Nixon's firing of special Watergate Prosecutor Archibald Cox and the subsequent resignation of Elliot L. Richardson. Bork was known to feel the government's case against IBM was unfounded. He stated his belief that IBM attained its position in the computer industry through superior efficiency.

— — —

LOUISVILLE, Colo. — Storage Technology Corp. (STC) announced the 8000 series disk storage subsystem. The series was designed as a replacement for the IBM 3330 disk subsystem in applications where users had high volumes of data with low to medium data accessing activity.

Eight Years Ago
Nov. 4, 1970

WHITE PLAINS, N.Y. — IBM announced its newest version of the System/3 Model 6. The keyboard-oriented system was programmed in Basic and included disk capability and ledger card use. The system was priced at about $1,000/mo for a typical configuration.

— — —

WASHINGTON, D.C. — Hearings initiated by the Labor Department and the Association of Data Processing Service Organizations were to probe the question of computer programmers as "professionals." According to reports from these two organizations, one result of achieving such official status would be a programmer's exemption from minimum wage and overtime pay laws.

White Hat, Black Hat

U.S. Image Poor at World Information Meets

By Herb Grosch
Special to CW

I attended the recent conference on Strategies and Policies for Informatics (Spin) in Torremolinos [CW, Sept. 11] as an adviser to the Intergovernmental Bureau for Informatics (IBI). The other sponsor of the conference, and the source of much dissension and ugliness, was the Paris-based United Nations Educational, Scientific and Cultural Organization (Unesco).

Representatives of 80 nations were present and the focus was on the less-developed countries (LDCs) — the most recent euphemism for Togo, Bolivia *et al*. Representatives of Red China and the Vatican were also present. The most notable absence was that of Japan, the Number Two in world information science and a major aspirant to the role of hardware supplier to the LDCs, especially in Asia.

Bear with me while I set the political stage; it's complicated. Once upon a time [sigh!] almost nobody had computers. I'm talking about the early '50s; there were a few Univac Is and a few IBM 700s, and the British had shipped big Ferranti machines to Kelly Gotlieb in Toronto and to Italy. There were Deuces and Leos but only in England, and the American machines were likewise domestic.

Countries without easy access to computers hungered for hands-on experience. So, with Unesco support, an Internation Computation Centre was organized in Rome. The idea was to install a major machine, perhaps donated by a rich manufacturer, and let Uruguay and Iraq run scientific and government work on it. This was to be free of charge, at least at the beginning, as I remember the plan.

Well, it didn't jell. A director was appointed — an Italian. A few staff people, notably a great secretary named Annie and a wild Sicilian chauffeur, were hired. But nobody gave them a computer. They put out computer center directories for the rest of the world (the U.S. was growing too fast for them to catch up). They sponsored a few European meetings. But their presence was not valued, and hence they got little funding.

Several directors and a dozen years later, a new charter turned the computation center into IBI and a mission to aid development of computer applications, largely governmental, in the less advanced countries was adopted. Trouble was, lots of LDCs signed on (at minimum subscription rates). But the majors — the U.S., Britain, West Germany, Canada and Japan — had never wanted or needed to join the computation center and saw no reason to spend money and time on IBI when it came around. Call it selfish if you will, or simply put it down to unattractive and unimaginative management in the '60s at the center — the U.S. and UK stayed away.

Meanwhile, IBI was trying. It got a smooth new director, an Argentine named Bernasconi. France, Italy and Spain contributed, the former with an eye on sales of hardware and software from its national enterprises, especially in North and West Africa. Cost Paris the earth, it did, and they grumbled. But they paid.

While I was president of the Association for Computing Machinery, I wrote a three-way letter to Pasty Mink, now departed, and Maines at State, and to Jordan Baruch at Commerce, advocating reconsideration of American nonadherence to IBI. I argued that since most of the LDC installations from Chile to Nepal were of U.S. origin, we sort of owed it to the poor devils.

I also said that, as the government of the (by far) most important computer-using nation, they ought to join everything — as IBM does, for instance. And on the practical side, I mentioned trade by American hardware and software houses and the incursions of the French.

Well, the answer was no. I appealed, suggesting some strategies which included other hold-out countries as well; no answer at all on that one. I put it on a back burner.

But as the long planning for the Spanish meeting progressed, it became clear that all of the majors (except Japan, as it turned out) and most of the Eastern Europeans

(Continued on Page 22)

Reader Commentary

Analogies Help Clarify DP Basics for New User

By Jim Ryan
Special to CW

During the past few years, the numbers and types of people using computers have changed drastically. The change has been from a relatively few highly specialized people using expensive machines to a large number of people using comparatively inexpensive machines.

These people would like to see the computer as a rather simple machine that can be operated with a minimum of effort like most household machines.

Unfortunately, the only machine that comes close to this objective is the hand-held calculator, which is not considered a computer by DP professionals, in spite of the fact that it performs most of the functions the original computers performed.

The major and most significant difference between the calculator and the computer is the lack of memory storage in the standard calculator. Because of this there is no need to move information from storage to the mathematical processor.

This difference has created misunderstandings between the new computer user and the professional computer systems designer, who spends most of his effort providing means for storing and moving information.

With this thought in mind, I would like to attempt to describe computers for new users in terms that relate to the new user's general background.

To establish this common base, I am going to attempt to relate the computer to a library and an adding machine, two familiar tools.

First the library. Every book in a library is cataloged and assigned a specific code number. The number of digits in the code number is based on the filing system established by the librarian.

A computer can be compared to the library in this function in that the items to be coded must be identified and studies made to determine the number and type of digits to be used to ensure a good filing system. This is one of the first things that frustrate the new user. Just the thought of setting up the equivalent of a new library file before the computer can be used scares many people away.

The problem doesn't stop here, however, because just as in a library space must be allocated for the storage of books, in a computer, space must be allocated in the machine's storage section for the items that must be stored.

In the library situation, it is a physical problem and the librarian usually can, with a lot of careful planning, make maximum use of the space available.

In the computer, the job of properly storing information to attain the most efficient use of storage capacity and speed of information retrieval is a science in itself. New users should be aware

(Continued on Page 24)

The Taylor Report

Major Audit Firm Cited For Unethical Practices

By Alan Taylor
Special to CW

An unexpected result of the questionnaire "Do Auditors Need Curbs?" [CW, Aug. 7] was the emergence of one of the "Big Eight" auditing firms, Arthur Andersen & Co., as suspect of the "worst" practices.

E.G. Marchi, president of Control Information, Inc., a systems software firm in Oakbrook, Ill., said that other auditing firms are guilty of bad marketing practices but that Arthur Andersen is the worst offender.

All of this interested me, so I went to Detroit to see for myself how Arthur Andersen had been conducting its business since it attained a foothold in city government seven years ago.

The city of Detroit has an auditor-general and an external audit is carried out every five years. In 1973, for instance, the audit was performed by Coopers & Lybrand, and this year the auditors are Price Waterhouse & Co.

Various city government agencies — for example, The Board of Education and the Water Department — have their own auditing arrangements.

As far as I know, Arthur Andersen first appeared on the scene in connection with the Board of Education from 1971 to 1972. It got the job of auditor with a low bid of $12,500 for the year's work.

And this seems to have marked the end of competitive bidding for auditor, consultant and software supplier. Between 1974 and Feb. 23, 1977, there was no competitive bidding, and Arthur Andersen collected some $916,067 in fees.

One City Council member talked publicly about "payoffs under the table to board members." Still, Arthur Andersen continued to act as auditor for the Board of Education in full knowledge that it would be examining nearly $1 million worth of consulting it had provided.

The Board of Education voted in October 1972 to develop internally a new personnel payroll system. In February 1975, after two key board employees left the implementing team and without any further vote, Arthur Andersen was called in.

The 1972 vote reportedly made it unnecessary to get formal board approval of the Andersen project or to call for competitive bidding. Under the recommendation of Clement Sutton, the Board of Education's finance director, Arthur Andersen was recommended for the job.

Meanwhile, in Detroit's Water & Sewerage Department, Arthur Andersen was making more money. In January 1976, a request was made to give Arthur Andersen two contracts at once — $130,000 for a study to create a computerized process of setting future water and sewer rate increases and $906,000 to provide

(Continued on Page 26)

Reader Commentary

Irani Users Need Guidance to Avoid Waste

By Hossein Mobayeni
Special to CW

Having had five years' experience in DP systems and having completed an M.S. in computer system applications, I question "Irani Government Termed 'Computer Junkyard' " [CW, Sept. 18]. I would like to suggest that the best solution to Iran's problem would be to put a stop to the most disastrous rip-off that has been perpetrated for the last five years upon the government.

During the last five years, at the Shah's orders, the government has bought more and more expensive machinery, to the point where there is 0% utilization of the 150 installations under the care of novices.

I am not alone in thinking that there are several principal phases that must accompany computer acquisition.

Analysis and design are the first steps in developing a new technology. This phase must identify economic justification, design alternatives, system requirements, system specifications and programming language. The novice user, of course, should not be responsible for these steps.

How could the vendors, who are competing to get rid of their wares, have conducted such analysis for 150 installations? Can 150 installations completed over an 18-month period be successful? Does the user of a Univac 1110 know the system and what the system can do for him?

In the selection phase of acquisition, a selection plan, accurate specifications, size and evaluation criteria must be established. These are more important than setting off a race among, again, novices.

Who is the novice user or vendor? Should the Ministry of Education be the training place for vendor personnel? Are the vendors looking for hardware financial support? They still have a large software market in government agencies in the U.S.

In the installation plan, a schedule should be set up for making sure power, communications links and temperature control are adequate. It should be the vendor's responsibility to lay out the schedule.

Over the past five years, computer manufacturers have been delivering systems to the purchasing organizations. The time has come for the Irani government to put a stop to this before it gets ripped off more.

Without a plan for educating the user in the basic functions of DP in order to keep the user from purchasing for prestige, and in order for the user to understand the demands of DP, it would be better to go back to manual systems. *Mideast Computer* could be helpful in introducing the computer and explaining what computers can do.

The reasons for huge and expensive contracts may then be understandable.

Mobayeni is an employee of the Irani government. He recently received his master's in computer systems applications at American University in Washington, D.C.

U.S. Giving Poor Impression at Meets

(Continued from Page 21)

would attend, not as IBI members of course, but as members of Unesco, which was a cosponsor. So I probed a little in Washington and found that an American delegation would indeed be sent.

Chance to Contribute

Even if the decision, taken somewhere down in the basement at Foggy Bottom, not to join IBI was not reversed, there would be a chance for us to contribute to the discussions and offer advice and friendship. The hegemony of the U.S. is deeply resented in many of the LDCs, and our manufacturers (notably IBM, which had two very attentive attendees from World Trade at Torremolinos) bear the brunt of much of this resentment: Hewlett-Packard Co. has troubles in Iraq, IBM was run out of India and CII/Honeywell Bull gives all of our boys a hard time in the French-speaking LDCs.

The delegation was an utter disaster. There was one White Hat, the president of the National Association of State Information Systems (Nasis). But the leader was a retired Unesco politician named John Fobes, now teaching at Duke, who clearly didn't know a transistor from a toggle switch. With him was a meek soul from Commerce's National Technical Information Service (NTIS), who cleverly brought no samples of his dubious wares, and a chap named Pikus from the defunct Mink purlieus at State, reasonably knowledgeable about sensors and the space program, but with only trivial knowledge of our trade.

Fobes clearly had been instructed to keep a very low profile indeed — which of course was all he *could* do, with that crew and his own complete lack of experience and interest in the field.

The British delegation was a startling contrast. It was headed by my old friend Reay Atkinson, head of the Central Computer Agency in Whitehall and now head of the Department of Industry activity pushing British interests in hardware and software. He had the head of the British Computer Society, the head of the computer services trade association, the head of the National Compter Center (education, seminars, publications), a senior executive from International Computers Ltd. and a couple of intelligent gofers to help him.

Guess who looked good?

Moreover, our outfit was not only imcompetent and (by instruction) cowardly, but biased. The meeting divided over and over again between IBI and Unesco adherents. The British and the Canadians, although not IBI members, played it cool. The French, members of both, and with a huge and alert delegation, did likewise. Fobes, who was presiding officer at one session, was so clearly a creature of Unesco as to be embarrassing to the few Americans present.

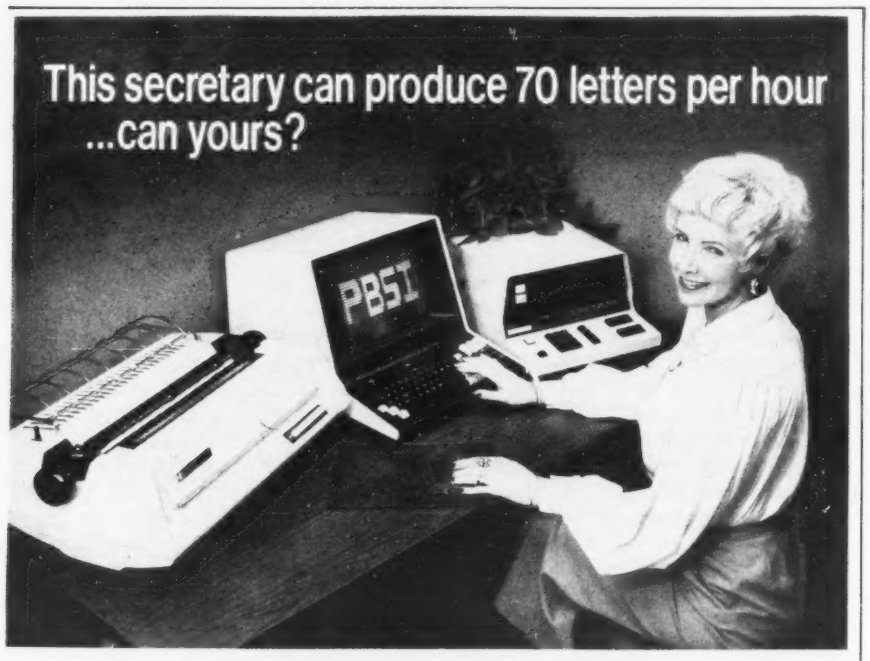
I had to sit and fume. Pikus knew of my ACM letters to State; Fobes obviously had never heard of ACM or of me in his life. The others perforce kept still.

So, when the Nigerians excoriated IBM ("certain dominant multinationals") and demanded free training, better documentation, cheaper prices and general subservience, our mealy-mouthed diplomats suggested minor changes in wording.

Did they boast of what we'd done worldwide? Did they defend our economic system? Did they offer bilateral cooperation, as the British very effectively did? Not they!

No, the U.S. won't join IBI or give any evidence of concern for computer hunger in the LDCs. Our image was poor when Torremolinos convened; it was mud as it ended.

What a state! What a State!



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Letters to the Editor

Standard Architectures Needed by Users

Surely I am mistaken, but my impression of the editorial "Procurement Paradox" [CW, Sept. 25] was that you are trying to snuff out discussion of architecture-specific procurements. In veiled threats of "devastating impact on vendors" and "vendors would need years to react," the editorial implied that the U.S. government is foolish for brewing up another poor solution to a complex issue.

I am a user, not a vendor, and my hat is off to the Appropriations Committee for realizing the trend in the computer industry toward more and more plug-compatibility. The prices of equipment components have plummeted in the last decade because of plug compatibility and will continue to drop if we continue to support the trend.

An architecture-specific procurement policy is the user's way of achieving plug-compatible software; it is his way of saying I will take any new computer model as long as it is compatible with my existing programs.

There is no way of truly achieving plug-compatible software except to specify the architecture of the new equipment.

It seems each new issue of *Computerworld* reports another plug-compatible manufacturer. The trend is apparent. Technology has matured to the point where progress is not achieved by different architectures; it is achieved by preserving software and riding the crest of price/performance breakthroughs.

The time has passed when an architecture specification can be thought of as non-competitive.

Users have waited long enough for higher level languages to provide portable software. Why wait any longer? All we need is standard architectures.

Kenneth Blythe
Manama, Bahrain

Blatant 'Sexploitation'

I wish to address a blatant case of offensive "sexploitation" in the Sept. 18 edition of *Computerworld*. On page 6 of Hewlett-Packard Co.'s 10-page ad was a display that was repugnant to my sense of morality and fair play.

The use of a humanoid form to exhibit a high degree of "human" engineering was an admirable ploy for HP, but the figure shown was far from a mere representation of engineering finesse. The fact that the figure was female was not in itself unethical, but the figure was also obviously nude.

A comparable display of the exacting engineering professed by HP could have been accomplished by using either a clothed figure or one devoid of sexual characteristics. It would seem, then, that the glaring aim of this portion of the ad was not to appeal to the reader's technical sense but to baser, "animal" instincts.

I am neither a "woman's libber" nor a male chauvinist. I'm an intelligent, fair-minded member of the DP community who finds this type of technical "pornography" and sexploitation abhorrent.

I have hesitated this long to see if anyone else would write about this particular issue but have yet to see any mention of it in the paper. Either I've passed over it or the DP community is becoming blind and/or decadent. I hope neither is the case.

H. Andrew Shirley
Mulberry, Fla.

Case of Shortsightedness

The editorial "Zapped by the Zip" [CW, Oct. 9] only showed the weaknesses and the shortsightedness of the DP community. Are we to believe that the design of programs using postal addresses rests on the number of digits in one data item?

As for a significant hike in I/O costs: I live on a street with 10 characters in its name. Should we truncate this to 16 bits for the convenience of our machines?

Will you also lobby against the 21st century since so many of our programs have 19 wired into their dates?

CW's contention that the Postal Service must reasonably argue that any proposed changes must benefit the society it supposedly serves is true, but likewise the DP community also has a responsibility to benefit the society it supposedly serves.

Paul D. Lever
Carlsbad, Calif.

Old Enthusiasm Gone

R. L. Glass certainly qualifies for higher management [CW, Aug. 28] — he got hold of the wrong end of the horse completely. Stop worrying about the private efforts of Mal Microbus on company time, and worry about the enthusiasm Mal steals home at night.

"It's a personal computer" . . . "Mal bounds down the stairs . . . his mind seemingly locked in another world." Hey, management! Mal used to be like that at work, too. Then you took it away from him . . . his enthusiasm, his project, his pride.

The manager who offers his subordinates active participation and a worthwhile goal needn't monitor employee briefcases.

What happened to all those guys who wouldn't go home? They were having too much fun.

Phil Good
Kalamazoo, Mich.

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Reader Commentary

Definition of Software Cannot Be Dictated

By Robert M. Sherin
Special to CW

"Identity and image — that is the most serious problem facing the software products industry today." So wrote Martin A. Goetz in an informative feature, "The Software Products Industry: Its Future and Promise" [CW, Oct. 16]. What Goetz wrote about the software products industry can also be applied to the data processing industry in general. People simply don't understand what we do.

Output is readily understood, but the word "software" presents problems carrying multibillion-dollar implications for DPers. Goetz suggested the word stand for "one of the machine components of a computer system." Others say "software" is computer input. Caught in the middle are lawyers, not knowing what to think, proposing a single definition.

There can be no monopolistic claims to the word "software," no single definition dictated to DPers. The industry should not be deprived of the benefits of recent decisions under state tax laws construing software as tax exempt computer input.

Software's definition in those cases translates to broad exemptions, basically because it makes no sense to tax those working with input and exempt those working with output. Moreover, an exemption across the board amounts to professional status under the sales tax law — parity with lawyers and accountants — the object!

Let the word "software" develop to reflect custom, rather than dictates.

Sherin is a nonjudicial legislative adviser to the Data Processing Management Association.

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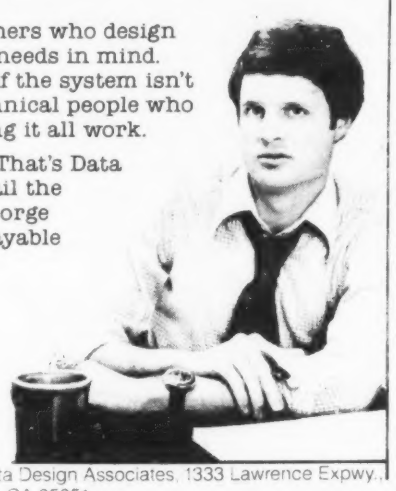

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Analogies Clarify DP for Users

(Continued from Page 21)

of the fundamentals of this problem so that they at least will be able to convey intelligently the amount and type of information they want stored so that the professional programmer will be able to do a good job.

In any case, the user must not be like the owner of a new house who continually wants to change plans during construction and eventually ends up with a very expensive disaster.

Now that we have discussed filing and storing, the next item to be covered is the movement of information. In the library, this comes in two basic categories.

First is the control of books being checked out and returned. There are many systems, some quite elaborate, which have been developed for this purpose.

In the case of the new computer, the user must establish a system for adding and removing information to the machine's storage capacity. In the modern DP world, many quite complex machines have been developed with elaborate methods of entering and retrieving information.

Just the problem of maintaining security and privacy of the stored data has resulted in quite extensive coding systems.

The second problem in moving information is illustrated by the case of the librarian who wants to move sections of books to make room for new books or different categories of books. This also requires careful planning by the librarian.

In a computer, this problem occurs quite often as the user's needs change. A good systems designer will anticipate most changes so that the number of times stored information has to be moved is kept to a minimum.

This very briefly covers the functions of a computer as compared to a library and leads us to the second item, comparison to the adding machine. For this, we will use the hand calculator.

The user of the standard calculator with no significant memory can usually operate it on a step-by-step basis using a manual document as the source for input. The simplest operation is adding a column of figures. The operator enters the first number, presses the "add" key which tells the calculator to get ready to add the next number entered and so on until a total is requested.

In a computer system, the user must first set up a process for obtaining the required data from storage and then move it to the processing section of the computer before the mathematical process can actually begin. This means a computer system must have information transferring capabilities as well the ability to file, store and calculate.

Part of the information transfer process must include a system that will select, under the operator's direction, those specific items to be manipulated and the order in which they must be manipulated to obtain the required results. This can be — and usually is — an elaborate process.

To summarize, the new computer user must be prepared to define the data to be used in the computer in precise types and amounts, set up proper filing and storage systems and arrange to find a means of transferring data from storage to a mathematical processor.

Finally, when all of this has been accomplished, all of the raw data for the user's application must be coded and properly input to the system.

By this time, it must be obvious to the new user that buying or leasing the computer may actually be only the final result of all the studies that must be made prior to that decision.

The amount of study the user must undertake is somewhat related to the total amount of data to be controlled or processed.

For example, the use of the ordinary hand calculator needs very little study if all that is required is the solution of a specific problem. However, if the application requires any amount of stored information, then the whole problem of filing, storage and transfer of information must be explored. Usually the greater the amount of information to be processed, the more complex this portion is.

Up to now, I have deliberately avoided the use of DP jargon. Understanding computer phraseology will be another challenge for the new user as strange words are tossed around as if they were commonly used by the general public.

Strangely enough, if the user listens closely, he will find that most of the words are based on their English meaning but they seem to be in a new context. Further, the user will find that the more sensitive professional computer people will be able to communicate with the user without excessive technical jargon.

All of the filing, storage and movement-of-information studies are covered in a term known as software — as opposed to hardware, or the physical components of the computer. Software is well named because it certainly requires a lot of tender loving care, and if help wanted advertisements are any indication, software people are in great demand. The user should pay particular attention to this part of his installation.

The new user should be prepared to work hard but the rewards of careful planning are well worth the effort. The larger the installation, the greater the need for careful planning.

Ryan is a retired DPer.

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(Continued from Page 21)
the final phase of a customer billing and information system as well as the preliminary phase of a water and sewerage model.

Arthur Andersen already had a $630,000 contract with the department including $95,000 for the initial design of the customer billing system, $355,000 for the design of a personnel payroll system and $180,000 for the plans for a financial reporting and accounting system.

The reason for the "no lid" award was that Arthur Andersen's intimate knowledge of the computerized accounting system would make the final costs lower. The idea was supposedly checked with verbal bids from other firms which were "higher than Arthur Andersen's proposal because the other companies had less knowledge about the computerized acounting system developed by that firm," according to water department officials.

However, Perry Koslowski, president of Detroit's Senior Accountants, Analysts and Appraisers Association — a union composed of some 200 city government employees — had some questions about the matter, and in the end, competitive bidding was reinstated.

As it turned out, Coopers & Lybrand offered a bid of $695,000, which was lower than the original $906,000 offered by Arthur Andersen or whatever modified bid it may have offered during the bidding process. So, Coopers & Lybrand got the job.

A common strand between the school board and the water department matters, mentioned in the press, was City Finance Director Dennis O. Green, a former Arthur Andersen employee. It appears he recommended Arthur Andersen for various jobs.

In March 1977, the Green connections highlighted the news; at this time, the school board and the water department matters were general knowledge. In particular, Green's connection with the new Detroit auditor-general, one of his — not Arthur Andersen's — ex-employees was mentioned.

Marie D. Farrell-Donaldson, a certified public accountant, was appointed to the post of city auditor-general by the city council in March 1975. At that time, she was in her 20s. With the job situation so tight, this seems to have meant quite a jump in position for her.

Three years earlier, Farrell-Donaldson had worked for Green "only for eight or nine days in 1972 before taking a job as a junior accountant in the Model Neighborhoods Program, according to a report in the *Detroit Free Press* [Feb. 20, 1977].

In March 1977, as auditor-general, she was asked to submit a report to the city council about the biggest Arthur Andersen project, the City Financial Information and Control System (Fics). This project had earned the consultants from Arthur Andersen some $1,772,600 in fees from May 1974 to June 1977.

Breached the Contract

The auditor-general did present a report, but it failed to mention her staff's findings that the consultants had breached its contracts.

A copy of the suppressed draft report came into the possession of the press. It contained statements like "User departments stated that they were not contacted during the system design and that Fics reports have not been useful." It also charged noncompliance with the contracts.

But in the report to the city council, Farrell-Donaldson blamed the admitted lack of success with Fics on city departments' unwillingness to change. She claimed that vague contract terms made it very expensive to determine noncompliance.

Failing to send the contract to the city law department, she allegedly threatened the senior accountants with disciplinary action. The senior accountants, in turn, claimed she was keeping important information from the public.

All this did no good for the general integrity of the audit process. But at that time, nothing much came of it.

Now, however, the situation is clearing, and it is easier to look at the source of conflict, the Arthur Andersen Fics system for Detroit. But that will have to wait for another week.

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For Honeywell Users

'IDS/I' Gains Data Dictionary Option

By Don Leavitt
CW Staff

PHOENIX — Honeywell, Inc. has introduced an optional data dictionary package for use with its integrated Data Store/I (IDS/I) data base management system (DBMS) on large-scale Series 6000 and Level 66 mainframes.

The IDS/I-Data Dictionary (IDS/I-DD) provides the user with the means of implementing a customized facility for the definition, integration, management and control of the data elements that affect a data base system, a Honeywell spokesman said.

Beyond the support it directly provides IDS/I users, the dictionary package is significant because it indicates Honeywell intends to continue supporting users working with systems they like even if the vendor has — as with IDS/I — introduced new systems which it feels offer more and better capabilities, the spokesman added.

IDS/I was the first DBMS offered by Honeywell — perhaps, indeed, the first offered as a commercial product from any vendor.

IDS/I-DD is said to feature exception reporting and privilege deletions through password protection. The data dictionary system consists of routines that analyze Cobol or Honeywell's unique Index Sequential Processing (ISP) and Transaction-Driven Systems (TDS) source programs.

The dictionary support includes data element reporting, dictionary indexes, record creation, "where used" reports, IDS/I chain definitions, on-line maintenance through TDS and normal maintenance reporting, the spokesman continued.

The analysis support determines what data elements a source program is accessing and how each element is being utilized within the program, he said.

Within IDS/I, the dictionary can be used both for data analysis — to determine the fundamental structure of data — and for functional analysis, to determine the way in which events and functions use the data.

It can be used during the design phase of a data base or conventional file development project as well as in the storage structure design phase, where it is used as a tool for the refinement of the initial design as it is actually implemented on the physical storage media, the spokesman said.

Significant Features

IDS/I-DD can also support the running of application programs, the collection and evaluation of performance statistics, the performance-oriented tuning of the data base and the restructuring that is almost inevitably part of a data base operation as the user needs change, according to the spokesman.

In particular, the dictionary is said to support the creation of keyword, title and Cobol mnemonic indexes; the creation of dictionary reports and record definitions; and the resequencing of data elements, if required.

Honeywell's IDS/I-DD requires 48K words or 192K bytes of memory for its implementation. The package, excluding training and support, costs $14,500 and is expected to be available before the end of this year.

Ten Steps Offered

Consistency Urged in Software Selection

By Tim Scannell
CW Staff

CHICAGO — Consistency may be "the hobgoblin of little minds," but it is probably the most effective approach a DP manager or executive can take in selecting software, according to a recent speech here.

Without a structured and defined evaluation procedure, a manager will constantly be in the position "of having to defend every recommendation he is called upon to make," Gregory Walsh, assistant vice-president of the New Jersey-based Colonial Life Insurance Co., said. "And this task can only become more complex as the industry grows."

Participating earlier this month in a software products panel at the Information Management Exposition & Conference (Info '78) here, Walsh presented 10 steps that managers or executives might find useful when dealing with software vendors.

First, Walsh stated, the manager should regard his particular situation as totally unique. Other users' software should be investigated only for reference and not for duplication: "What is going to work for the fellow down the street who has the same equipment will probably not work for you."

Second, the user should determine his requirements and thoroughly explore the problems to be solved. Although this sounds simple, it is probably the most important step because all future decisions and the final package selection will be based on the user's knowledge of the original problem, Walsh pointed out.

Possible Solutions

Third, the manager should determine the possible solutions and compare them to what's offered by the software vendors and user groups. Buyers' guides, trade publications, sales presentations, industry consultants and other users can all provide input on the "basic features" and "bells and whistles" of the products under consideration.

The fourth step is to prepare a list of specifications and requirements desired in the software system. The list's composition should involve as many people as possible and the requirements should be compiled in "ranked order of importance."

Including the opinions of several people in the list not only offers different points of view, Walsh noted, but also "cuts down any resentment that might exist between [the manager] and the users of the product."

The next step involves developing a detailed evaluation plan. The manager has to determine which factors are most important to his installation, whether they consist of machine runtimes or information reported or developed by the package, Walsh said.

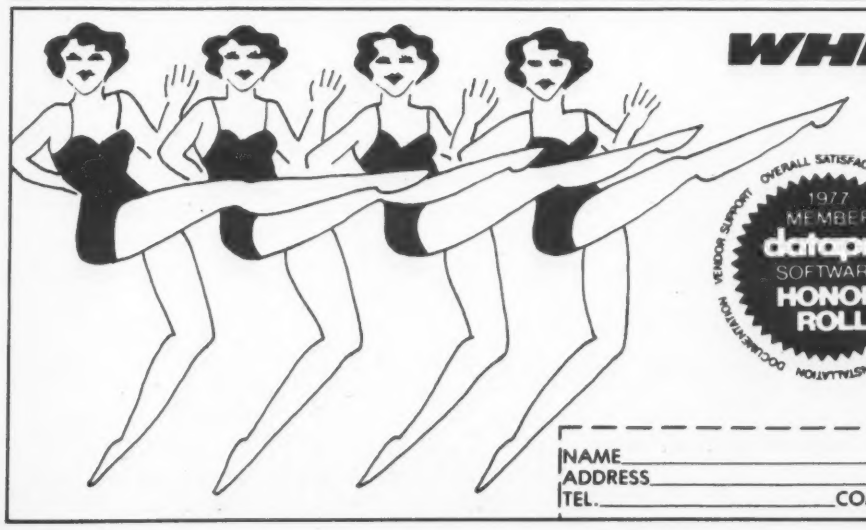
Sixth, the user must match all of the information gathered during the preselection process and compare it with the specifications offered by each of the package vendors. Those products that do not meet the manager's requirements can be eliminated and the best ones put aside for further examination.

Next, the user should personally interview each of the vendor finalists, keeping in mind all of the original requirements. "If you go to a demonstration, the vendor will show you a product that works," Walsh noted, so the user should not be swayed by first impressions.

The eighth step involves calling several companies on the user list, even though the list may be slanted in favor of the vendor. The potential user should have a series of questions ready to ask the present user.

Ninth, the manager should select two or three vendors for final consideration and bring in their respective systems for an in-house trial. Employees can benefit from vendor-supplied system education while the vendor "works for his sale," Walsh said.

The potential user should consider the price of the total hardware/software system last. The original objective was to find the best solution — not the cheapest.



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DP Director Maintains 'Programming Not Art'

By Tim Scannell
CW Staff

CHICAGO — The coded objets d'art of even the best programmers will, unfortunately, never be displayed alongside the masterpieces of Cezanne, Modigliani or Monet. Programming, from a manager's point of view, is a measurable labor and therefore subject to production and completion schedules.

"Programming is not an art ... and if you're not measuring productivity, then you're not producing," according to Walter Czerniak, DP director of Chicago-based Phoenix-Hecht, Inc.

Czerniak chaired a panel on productivity in software development at the recent Information Management Exposition & Conference (Info '78) here. The panel discussed and fielded questions on such topics as schedules, project development and cost-effective productivity techniques.

'Benchchecking' Urged

The programming manager — like the manager of any other department — must set certain measures or goals for the people on his staff, Czerniak stated. These measures could be lines of usable code, the number of completed projects or even a program's "dollar return to the company," he explained.

Before a programmer's production time can be measured, however, the manager must examine how much time the programmer spends "not writing code." Vacations, administrative duties, meetings, research periods and time spent discussing problems with the operations staff and waiting for program printouts all detract from the actual time a programmer spends coding a program.

In fact, Czerniak said, the normal 40-hour work week shrinks to about three and a half days when all of these "distractions" are considered.

The manager "has to know exactly how much is necessary, then proceed to eliminate wasted time."

Czerniak suggested "benchchecking" a programmer's work in much the same way that a machine is tested before it is presented to the user. Keypunch errors and "deliberately" sloppy programming should be eliminated before a program, rather than having the computer point out the errors and then rewriting corrections.

"The more time you spend up front, the less it will cost in the long run," Czerniak noted.

Productivity assessment begins with an examination of three key areas, Czerniak said. First, the manager has to be aware of the knowledge level of each member of the programming staff. This knowledge includes the amount of formal education, work experience, familiarity with the machine and ability to "do things faster," he stated.

Second, the number of tools available to the programmer is an important consideration for an accurate productivity evaluation. The type of computer equipment, whether it operates in batch or on-line mode, the data entry methods and compiler design all have a direct effect on a programmer's cost-effectiveness and speed, Czerniak indicated.

Finally, the type of controls specified by the manager and the assessment method used is significant to the rating process. How well a supervisor manages a group and whether a manager rates programmers according to their effectiveness or speed will influence the productivity rate.

Most importantly, Czerniak added, a manager should "be less concerned with equipment ... and give his own people the same aids and assistance given to the system's users."

'Credibility Gap'

Fellow panelist Frank Van Husen, group manager of Chicago's Shield Enterprises, Inc., stressed "common sense" software expectations.

"More projects have been devastated and destroyed by wishful thinking and poor planning than by anything else," Van Husen declared.

Van Husen focused his speech on the "credibility gap" that exists between a software vendor's initial promises — unrealistic installation times and capability claims — and the reality of the delivered product. First hardware/-software communions, he said, invariably feature poor reliability and a variety of excess user tailoring; they are never installed according to predetermined deadlines.

Managers should set priorities rather than deadlines and seek to identify variables that might affect the final results, Van Husen stated.

The panelist also warned his audience not to assume a "perfect world" and to allow for "illnesses, lunches and going-away parties for other employees." Responsibilities should be spread out among several employees rather than just one, he cautioned, alluding to the more than 30% turnover rate in the DP industry.

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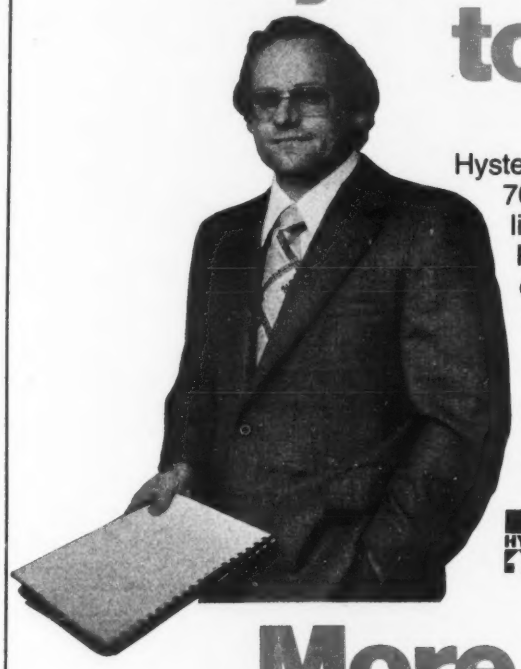

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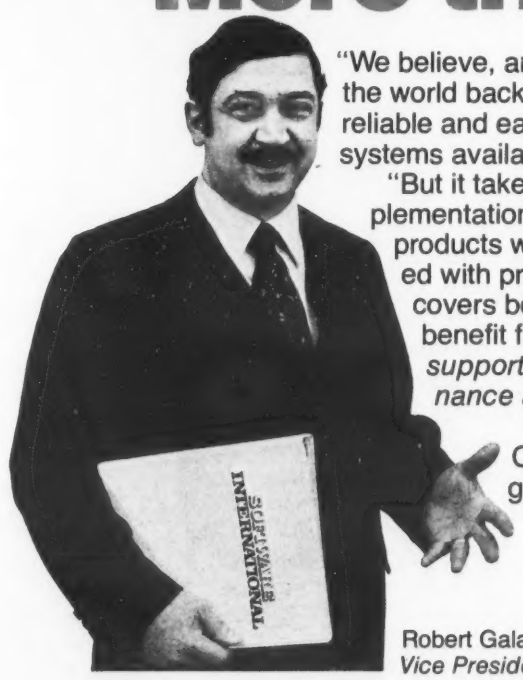

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Unite End User, System

High-Level Language: Revolution After DBMS

By Charles Ziering
Special to CW

The concept of data base management represents a major advance in the field of software systems development. While debates continue over the best underlying data model (Codasyl or network, relational and so on), the central thesis of the data base approach remains unquestioned.

A much more significant and less publicized breakthrough, however, comes with the advent of high-level, nonprocedural languages that operate on top of data base management systems (DBMS). Although data base management can yield significant percentage improvements in system development and maintenance time, improvement resulting from the use of higher level languages must usually be measured in orders of magnitude!

At a recent comparative data base symposium in New York, vendors were given a chance to present their data base system offerings. In the course of their product descriptions, it soon became clear that much of their comparison criteria were superfluous. One group, for example, boasted its data manipulative language was implemented in host language (e.g. Cobol) verbs. The other group championed its use of call statements.

The relative impact of these two approaches on the manpower required to develop a system, if measurable at all, is negligible.

Further, as hardware costs decline, most traditional comparison points become increasingly insignificant, especially in view of the dramatic increase in productivity achieved through higher level languages.

Data Basics

The experience of Mitrol, Inc. with the application of its Mitrol Industrial Management System (Mims) provides compelling evidence of these benefits. Mims is a high-level, nonprocedural request language that directs a network model data base manager. In addition to general report writing and transaction processing capability, Mims provides special manufacturing-specific functions.

The approach is quite different from that of the canned, menu-style systems normally offered for manufacturing applications.

Rather than selecting options from a predefined list of available functions, a customized application of the system is developed. One first defines the data base structure and the items of information to be recorded through an English-like data definition language. Then the request language is employed to custom-define all transactions, reports and queries.

Note that this is not simply a query language, but one that can handle all aspects of data base use. The power and flexibility of this language obviates the need for programming in all but isolated cases.

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Four of our analysts accomplished the feat in six weeks, actually spending much of the time debugging the specifications. That represents a factor of 13 reduction in man-time and a 26-fold reduction in delivery time.

Perhaps more interesting, as a result of real experience working with the system, improvements and extensions effected changes to 70% of the reports and transactions during its first year of operation. That degree of change in a traditionally implemented system requires tremendous resources.

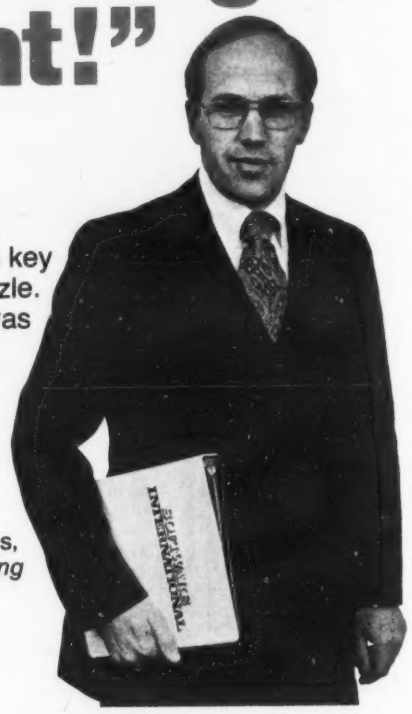
It is significant to note that data base management was an important prerequisite to the development of nonprocedural languages. Languages must be built on some framework of world knowledge or model of the data under consideration. To many, unfortunately, data base management seems to represent a record processing expedient. It can take on much added significance, however, when viewed as a mapping of real world associations.

As such, the data base can provide the information model required to support the structural framework needs of a language. Thus, it is not necessary to define a new language for each application.

High-level, nonprocedural languages provide benefits far beyond reductions in development and maintenance time. These languages also help reduce computer system alienation by bringing the system closer to the end user.

Ziering is a systems consultant for Mitrol, Inc. in Lexington, Mass.

uced parts shortages of one per cent!"



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Not From Users, But From DP

Resistance to 'DA' Coming From Strange Place

By Robert Chamberlain
Special to CW

For many years, those of us who take data base seriously as a device for representation of real business activities — instead of as a file management frill — have treated data base administration as very central to a true integrated data base system.

For an equal number of years, it seems, installations have been determinedly ignoring it or paying lip service by giving the person who designs the data base file the title of data base administrator (DBA). If, however, the DBA ever attempted to administer anything, he could expect to have his design pencil broken and be sent back to the programmer pool.

An attempt is being made at present to step around this lessening of the DBA's responsibility by creating a distinction between "data administrator" and "data base administrator." This would allow the file designer to retain his classy title while reporting to a new position, the data administrator (DA). The DA would carry the authority originally intended for the DBA.

Data Basics

The DBA would be a member of the data administration staff; the DA, by virtue of staff and responsibility, would have a position of significant stature. The question of the exact proper placement is political and would vary from organization to organization.

The DA would then lead the internal determination of the following data issues:

- Data dictionary scope.
- Data applicability vis-a-vis user requirements.
- Data base design/redesign.
- Supervision of conventional file structure.
- Performance measurement supervision.
- Future configuration analysis.

These data issues reflect no new developments or claims for originality or inclusiveness.

Serious Resistance

Rather than reexamining the list's contents, let's find where the most serious resistance to the DA approach is found. It is not, by growing observation, in the user area but rather in the DP group.

The real reasons for this resistance are not being candidly stated now. The typical reasons being given are that "The idea is not real world" or "It can't be done here." Let's look at these in a little more depth.

The phrase "real world" connotes a tough performance-oriented, shirtsleeves management type of approach. It also indicates a predisposition to pragmatic, successful implementation.

Current implementations of low-level DBAs are notable in their use of the DBA as only a technical consultant. The resulting creation of a multitude of mini data bases consisting of converted conventional files cannot be termed implementation success.

Since this does not meet the test for pragmatism, "real world" must mean something else.

Used as a code phrase meaning "anti-academic," it implies the rejection of impossible "theoretical" standards. In this case, the radical academic notions which are being rejected include control, definition and centralized accountability — concepts to which performance-oriented management should be cordial.

Brave But Outgunned

Something else must be at work, then, which is more challenging to DP management. Examining "It can't be done here" may be helpful.

At first blush, this implies a brave but hopelessly outgunned DP department frustrated by user or upper management intransigence. An attractive picture to DPers, but quite at odds with reality.

Looking at the changing DP environment, we can see a combination of vastly increased computing power and sophistication (witness the tremendous advance of the microcomputer, the superchips, etc.), combined with an increasing user awareness of technological capability; the office of the future will reflect this changing structure.

Firms which work with large and medium-size organizations are currently constructing increasing numbers of multifunctional teams which simultaneously work with users and DP.

Interfaces with an increasingly large number of users have shown their rapidly growing awareness of data administration principles. Furthermore, it should also be an open signal to DP that these users do not couch their awareness in terms like "too theoretical" or "DBA's task is data base file design."

And if that is not a sufficient signal, the fact that users are comfortable with concepts like nonmechanized data elements in the data dictionary and DA review and supervision of conventional file contents should sound a real alarm bell to DP reactionaries.

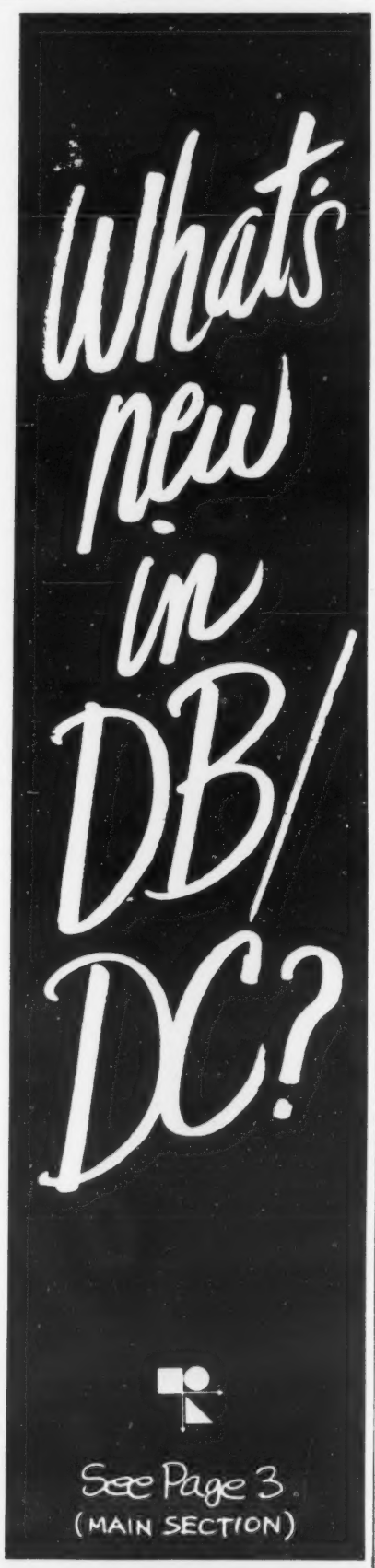
Issue of Property

It is against this background that we can determine the real source of the resistance to the data administration concept. It is simply that DP is resisting the idea of data being a corporate resource rather than DP's property.

The more blurred the distinctions become between DP and non-DP work (e.g., in the area of distributed processing), the more determined the foot dragging regarding data administration becomes in some DP departments. Why? Because of a fear of the unmentionable: that the DA may be a non-DP type.

Rather than seeing this as an opportunity for expansion of its influence (perhaps by gaining a DP DA over non-DP staff), DP has chosen to gather its wagons into the proverbial circle with the so-called DBA wandering inside, measuring data base accesses. "It can't be done here" has become "It won't be done here."

Let's hope more changes in nomenclature won't be necessary to overcome this current DP resistance and put real DAs into positions of influence. I, for one, would rather not have to start advocating a "chief data officer."



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With T/S, DBMS No Longer Just for Big Users

By Robert C. Pinto
Special to CW

Data base management systems. Even today, that term still evokes many erroneous images.

Many people, for example, believe a data base management system (DBMS) is a quite expensive piece of software that only large organizations with their own computers and massive quantities of data to process can afford to use.

The reality is quite the opposite. To be sure, many giants in both the governmental and corporate worlds rely on DBMS. It is equally true, however, that many small enterprises with DP budgets as small as $1,000 to $2,000 a month are making quite effective use of DBMS.

How? The answer, as you may have guessed, is through the use of time-sharing services purchased through commercial service bureaus.

Today, almost all remote-computing service (RCS) vendors offer a complete line of data base management products. They are able to do so mainly through licensing agreements they have with both minor and major software producers.

Data Basics

Considering the communication networks offered by these RCS vendors, DBMS are available by a local call from an estimated 95% of all the telephones in the world. Amost any organization of any kind can thus, on a fee basis, access one of the DBMS on the market.

More and more organizations of all kinds, from the smallest to the largest, are learning that DBMS services purchased through a service bureau are the answer to their DP needs. Even organizations with in-house computers often use such services for special purposes, such as prototyping an application before moving it in-house.

Users who rely entirely on remote time-sharing services, however, differ significantly from large users with their own in-house computers. The small user is, in almost all ways, a different breed.

First of all, the user who relies entirely on RCS usually is little concerned with such performance measurements as I/O rates, throughput or storage requirements. All he is really concerned with is how effectively the DBMS can satisfy his problems at hand, whatever those problems may be. His evaluation criteria are generally reduced, via various formulas, to costs and dollar savings.

The RCS user differs significantly from the in-house user, too, with regard to how he defines "small," "medium" and "large" data bases. For the RCS user, a "small" data base is one that is less than 1M characters. The range for a "medium" data base is from 2M to 10M characters; a "large" data base ranges from 10M to 50M characters.

Another significant difference concerns costs. In the RCS market, the monthly dollar outlay for data management processing averages between $2,000 and $5,000. For in-house installation, in contrast, monthly costs are generally $15,000 or more.

Satisfactory Results

For his relatively small expenditure, however, the RCS user generally gets just the kind of services he most desires. The main reason is that his objective is typically to obtain very specific results on a relatively short-term basis.

Generally, too, the RCS user designs each given data base for a single-purpose application that will be used by relatively few individuals. It is rare that the RCS user uses a data base for multipurpose applications.

The specific applications may cover a wide range, but quite often they are of an inventory nature. The word "inventory," however, must be used somewhat loosely rather than in a strict accounting sense.

Typically, inventory-like data bases are used to keep track of quite specialized resources, such as engineering or architectural drawings, outstanding loan commitments or vehicles in a motor pool.

Quite often, RCS users, including many large organizations with their own in-house computers, buy data management services for the purpose of prototyping applications or individual features of applications. They find it easier, quicker and cheaper to make trial use of applications before fully developing and installing them.

Many other kinds of firms, however, use RCS data management services for project control. Included among them are scientific research organizations, research and marketing firms, hospitals, architectural concerns and even theatrical companies.

Pinto is with MRI Systems Corp. in Austin, Texas.

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NAC Report Concludes

Packet Switching Best for Voice, Data

By Ronald A. Frank
CW Staff

GREAT NECK, N.Y. — Packet switching is the most effective technique for implementing a voice/data communications system, according to a study completed by Network Analysis Corp. (NAC).

Although the study was undertaken for the Department of Defense to analyze its future needs, the NAC report stated that the conclusions "relate to large users who lease tariffed lines and lease or purchase hardware."

In determining that packet switching is the most efficient method for transmitting voice and data, the study also found that the conclusion remained the same for an integrated voice/data network or for separate voice and data nets.

The study examined packet switching, circuit switching and hybrid (circuit/packet) switching techniques. Each technology was studied in respect to the handling of both voice and data traffic.

It was assumed that digitized voice would be transmitted over packet-switched networks. Using vocoders to digitize speech information, it was found that even at 2,400 bit/sec, traditional circuit-switching network costs were higher than those for packet-switched nets using 64 bit/sec digitizers. Low-bit-rate voice digitization systems may include speech quality degradation and may not be acceptable for certain user environments, the report noted.

Packet-switching technology was found to be superior over the range from 2,400- to 64 bit/sec voice digitization rates.

The study findings are considered significant because previously it had been generally assumed that circuit-switched facilities such as those provided for private lines were best for voice applications, while packet-switched facilities were best for data. The findings imply that users who implement packet networks can optimize their communications efficiency and costs by handling both voice and data with packet technology. Additional research into the operational benefits of packet networks is anticipated, an NAC spokesman said.

The study found that segregated voice and data nets result "in only slight cost increases over an integrated voice and data network for all network technologies considered. Further, segregated packet nets for voice and data cost less than integrated systems using either hybrid or circuit-switched technologies," the report said.

(Continued on Page 34)

Public Networks Still Safer For Many Users, Experts Say

By Brad Schultz
CW Staff

CHICAGO — Although soaring public net rates and uncertainties about federal regulation of communications are moving many large corporations to consider establishing their own private networks, experts warned here last week that public tie-ins remain the best choice for many users.

The advantages of a public network include immediate availability of the services, widespread geographic coverage, no entailed capital investment, high component reliability, equitability of cost based on use and easily accommodated expansion. In addition, maintenance burdens are placed on the carrier's shoulders, Howard Anderson, president of the Yankee Group, said at the Information Management Exposition & Conference (Info '78).

Addressing a session on "Information Systems Planning for the 1980 Corporate Environment," Anderson predicted AT&T's proposed Advanced Communications Service (ACS) will obviate the need a number of the largest U.S. manufacturers now have for multiple network services. He noted that General Motors Corp. has 29 networks and Ford Motor Co. has six nets "out of the same building."

Just deciding whether and how to implement a private-line net can cost up to $1 million and drag on from four to 18 months, according to Michael D. Sims, Consolidated Rail Corp. assistant vice-president for systems.

The benefits of the private-line alternative were said to include "economy of scale," cost stabilization, enhanced productivity and service or control of the user's own products.

To decide whether such service would be

(Continued on Page 34)

Computer Optics Adds Line Printers, Cuts Prices Across the Board

BETHEL, Conn. — Computer Optics, Inc. has announced two line printers for its IBM 3270-compatible CRT systems and across-the-board price reductions.

The 8150 is a 150 line/min matrix line printer that includes a 96-char. Ascii set rated for 132 print positions.

The second printer, the 8130, offers the features of the 8150 with a 96-char. Ascii set but is twice as fast with speeds to 300 line/min at the same rated 132 print positions. Both the 8150 and the 8130 print up to six copies with no ghosting, smearing or imprinting.

The printers can operate in receive-only mode using IBM 2780 and 3780 protocol.

The 8130 is available with a one-year lease for $540/mo or a two-year lease for $405/mo and the unit can be purchased for $13,250. Deliveries of the 8130 are scheduled for 120 days. The 8150 costs $365/mo on a one-year lease, $275/mo on a two-year lease and $10,700 to purchase.

Price reductions of as much as 30% were announced on other Computer Optics products, including remote and local CRT systems.

A typical IBM 3270 system with local controller, 10 displays and two printers costs $65,125, while a similar Computer Optics system using the 8150 printer can be purchased for $43,480. Similar savings occur on a two-year lease program. The IBM system is available at $1,529/mo, compared with Computer Optics' system rental of $1,233/mo, the company said.

Computer Optics, Inc. is at Berkshire Industrial Park, Bethel, Conn. 06801.

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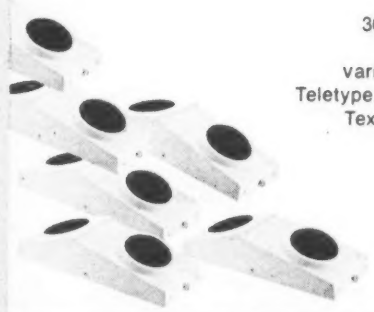

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Scanner Added to National Semi System

SANTA CLARA, Calif. — If the checkout clerk at a supermarket counter can see the Universal Product Code (UPC) printed on a box or can, then the National Semiconductor Corp. Bar Double-X (BDX) point-of-sale (POS) scanner can read the code without the article being tipped in its direction, according to the vendor.

Part of National Semi's Datachecker POS system, the BDX unit reportedly eliminates three problems encountered with other UPC scanners: the need to fit the product carefully to the scanner, poor recognition arising from nonstandard package shapes or dimensions or labels of marginal quality, and the dependence of checkstand design on the physical dimensions of the scanner and related terminal components.

In spite of these common problems, UPC scanning yields savings from enhanced productivity, reduction of shrinkage and improved data collection, the vendor stated.

The "front read" range of the BDX is 180 degrees and the "bottom read" range is 360 degrees, reportedly allowing the unit to scan a product with the code label facing the checker — even if the label is held upside down. This results in less checker fatigue and more one-pass scans, the firm noted.

The BDX can read code labels printed on plastic, cellophane and wax-coated containers more accurately than conventional POS scanners do, the vendor continued. Unique features of the unit's decoding logic are said to include a beam speed fast enough to read every label many times and a constraint that two consecutive readings must agree before the logic will decode the symbol and apply the check digit algorithm.

As a result, poorly printed symbols and symbols on reflective packages are read correctly at a much higher rate than for any other scanner system, with productivity improving proportionately, National Semi claimed.

The scanner can fit into an over-the-counter checkstand and still permit the cart to pass underneath.

The BDX with interface to the Datachecker system costs $3,745 with quantity discounts available. National Semi is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Packet Switching Seen Best Technique

(Continued from Page 33)

According to the study, traditional circuit switching has poor price/-performance characteristics for interactive data applications because channel capacity is dedicated to users during idle periods. This method is poor for voice applications because it does not detect and eliminate periods of silence during speech.

It was recognized that a transition period may be required for users to phase from traditional circuit to all packet technologies. It was noted that during this transitional period, hybrid systems incorporating both technologies would be suitable.

The study said that packet technology would be suitable for varied levels of access and transport priorities while in a circuit switched environment, facilities must be dedicated to high-priority customers. During high load conditions, this would result in low priority preempted users placing an additional burden on the network with redialing attempts.

Using standard tariff rates in effect on AT&T's Dataphone Digital Service (DDS), the study found that packet switching will remain superior even if switching or transmission costs "decrease by a factor of 10."

Copies of the study are available from the Defense Documentation Center, Washington, D.C. The study is titled "Economic Analysis of Integrated DOD Voice and Data Networks," Arpa Order No. 2286, Contract No. DAHC 15-73-C-0135.

Public Nets Safer for Many

(Continued from Page 33)

appropriate, a company must conduct an economic evaluation, a technical evaluation and a trade-off analysis, Sims said.

The economic study must consider both the firm's prospects and those of the general economy; the technical appraisal must examine the state of the art and speculate on how it will change many years into the future; and the trade-off analysis must carefully weigh the pros and cons in light of the firm's priorities and objectives.

Reasons for Popularity

Anderson has attributed the popularity of private nets to plummeting transmission costs. According to a Yankee Group report just completed, the cost of transmitting one million bits declined from $10 in 1962 to $1 in 1968 and will drop to a projected ten cents in 1980. This drop was described as having moved "savvy communications managers" in the private-line direction.

"Commercial users began to put multidrop facilities, concentrators or multiplexers at the ends of their lines — to build networks dedicated to specific applications," the report said. "It was the decrease in communications and switching costs [that] allowed for many private networks in the first place."

However, "in Europe, from the beginning, the [postal, telephone and telegraph authorities (PTTS)] felt that private networks were not the answer," the report continued. "The PTTS themselves installed a public network — it was there if you needed it . . . [and] conserved the need for capital because it was shared.

"Not the least of the advantages was the redundancy built in because of dual nodal processors and lines — a redundancy that essentially no commercial firm could cost justify," it said.

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OUR TERMINALS HAVE IT ALL TOGETHER

Fiber Optic Link in Works For Alberta Phone System

MELBOURNE, Fla. — Harris Corp., has released details of the T4 trunking system it claims will be the longest fiber optic link of its type when completed for Alberta (Canada) Government Telephone.

Harris is constructing the 50-kilometer link between southwestern Alberta sites in Calgary and Cheadle.

The fiber optics hardware was designed to be physically compatible with existing telephone-type equipment, according to J. Richard Jones of Harris Fiber Optics Systems Engineering.

Designed to have minimum impact on maintenance and training procedures, the optical fiber trunking hardware will be nearly identical to existing equipment insofar as appearance, installation, operation and maintenance are concerned, he said.

At the Electro-Optics Laser Conference in Boston last month, Jones reported that considerable theoretical and experimental effort was involved in selecting the best system configuration for the project.

A sophisticated computer simulation technique was used to study the tradeoffs between cable parameters and repeater parameters, Jones said, and a parallel effort involved evaluation of existing Harris equipment in field environments. This included the repeater and terminal transmitter and receiver modules used in multiple service operator trunks and other high-speed systems.

In addition, a field trial was performed to confirm that optical fiber cables could be installed with conventional field plowing procedures.

Jones observed that use of a microprocessor-based system controller improves the reliability and maintainability of the T4 trunk. The controller automatically monitors the in-service performance of working and protection lines, he noted, causing the link to switch traffic to a protection line in the event of failure.

After this switch is made, an automatic fault isolation procedure is executed in which the repeater sections of the failed line are sequentially tested to locate the failed repeater or terminal module, he added.

Lower Cost Stressed

Jones stressed that fiber optics can be significantly lower in cost than conventional technology — especially at the higher T3 and T4 capacities.

Cost per circuit-mile of fiber optic cable diminishes sharply at the T3/672-voice and T4/4,032-voice circuit rates, he noted.

The full text of Jones' Electro-Optics Laser Conference address is available at no charge from William R. Fitzgerald, Harris Fiber Optics Systems, P.O. Box 37, Melbourne, Fla. 32901.

DMC Offers POS Terminal With Built-In Diagnostics

SANTA CLARA, Calif. — The microprocessor-based DMC 9301 transaction terminal from the DMC Division of Cetec Corp. features built-in diagnostics, a 10-key numeric pad, six programmable transaction keys and eight prompter/status indicators.

The point-of-sale (POS) terminal provides an alphanumeric display with 16 positions and allows scrolling through the receive buffer for as many characters as the user wishes to define, DMC states. Customization can entail protocol, operation code and field descriptors, prompter light designation and customized case and key colors.

The DMC 9301 was designed to operate on a variety of communications networks, the vendor said, noting that a starter package is provided to tailor the product to specific applications.

The starter package consists of all customized software as well as two Model 9301s for multiple terminal testing. Optional features include a magnetic card reader, personal identification number pad, internal modem, six line cut form printer and a cluster controller.

The optional features are said to allow the terminal to address virtually all POS applications.

Base unit cost for the DMC 9301 is $995 with quantity discounts available. The product is warranteed for one year, and nationwide toll-free central dispatch service for either depot or in-field maintenance is available, DMC said from 2300 Owen St., Santa Clara, Calif. 95051.

CRT Emulates Several Units

CHICAGO — A low-cost intelligent terminal for the OEM user that features firmware emulation of several vendors' terminals was unveiled by Infoton, Inc. at the Fifth International Information Management Exposition & Conference here recently.

The Infoton I-100 terminal contains a Z80 microprocessor and a number of programmable read-only memories (Prom). The Proms reportedly emulate the control code sets of Digital Equipment Corp. VT-52, Hazeltine Corp. 1400/1500, Lear Siegler, Inc. ADM-3A, Perkin-Elmer Corp. Fox and Applied Digital Data Systems, Inc. 520 terminals.

The I-100 is said to provide computer control of keyboard scanning, screen formatting and editing, paging and line drawing with a 32-char. set. A 1,920-char. screen (80 char./line) offers a 25th line for status displays as well as a full 96-character Ascii set, switch-selectable transmission rates to 19.2K bit/sec, block mode transmission with protected/unprotected fields, up to eight programmable function keys and a 15-key numeric cluster, the vendor stated.

The I-100 costs $849. Infoton is at Second Ave., Burlington, Mass. 01803

CRT Displays 132 Char./Line

CAMBRIDGE, Mass — The ECD Corp. Smart Ascii is billed as one of the few intelligent CRT terminals able to display full line printer format: up to 132 char./line.

The terminal can display up to 40 lines on its 15-in. CRT screen, representing a total of 4,096 characters

The standard font is the full upper and lower Ascii character set, but by employing the supplied font editor program, the user can reportedly design his own special characters. Further, the keyboard is "relegendable," meaning the user can "easily" match a new character set, and foreign language fonts can also be implemented, ECO said.

The Smart Ascii interface does not require any special protocol from the host CPU. The terminal communicates via an RS-232 line and "looks like a simple printer/-keyboard combination to the host," the firm said.

This characteristic allows for either direct hookup or remote use via dial-up lines with keyboard-selectable transmission rates in the 110- to 9,600 bit/sec range.

The Smart Ascii comes with a text editing program.

The terminal, including 37K bytes of memory, a 78-key keyboard and two mini-cassette drives costs $7,900 from ECD at 196 Broadway, Cambridge, Mass. 02139.

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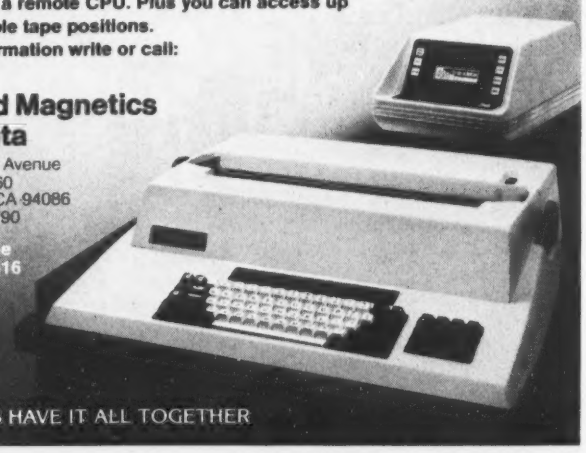

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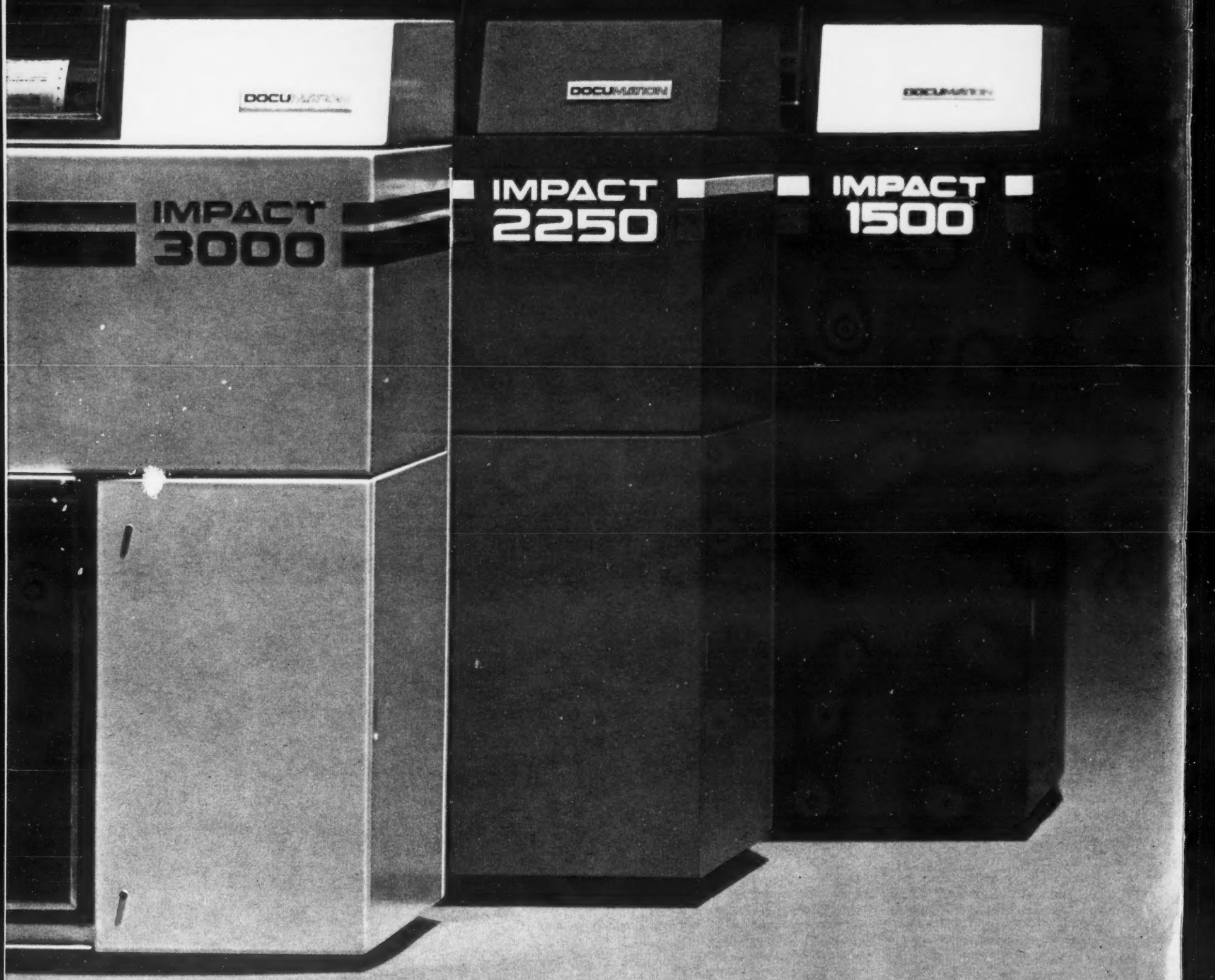

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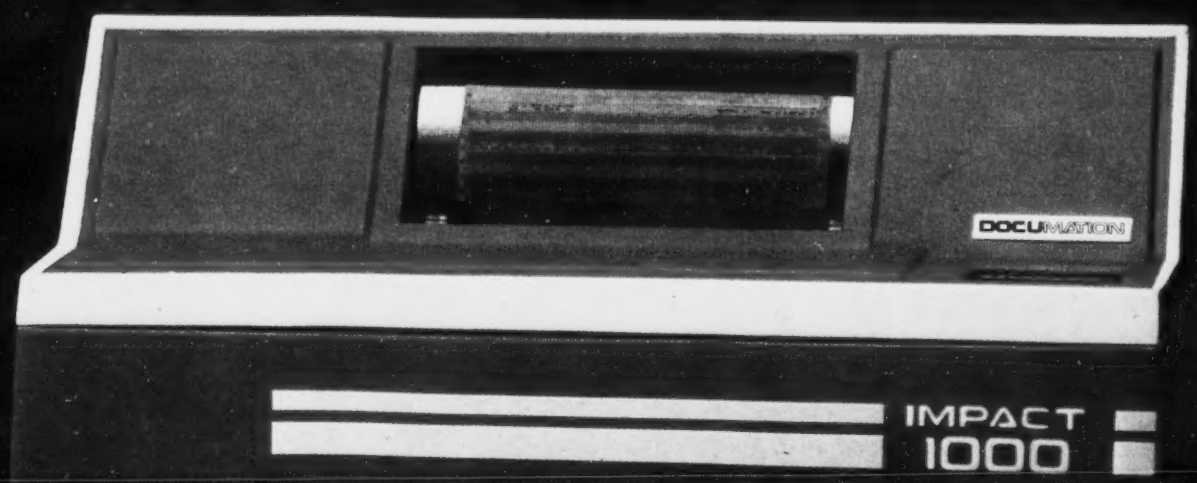

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Infotron Adds Smart Modem

CHERRY HILL, N.J. — Infotron Systems Corp. has introduced a microprocessor-controlled, 9,600 bit/sec modem whose design reportedly permits it to withstand line transients lasting up to 2 sec without retraining.

The DL 9600 operates point-to-point in full-duplex mode on a four-wire Bell 3002-type private line at 4,800 - or 9,600 bit/sec, switch-selectable. All-digital filters eliminate the drift found on analog units and provide an error rate of less than 1 bit in 10^6 at 9,600 bit/sec on an unconditioned line, the vendor claimed.

The LSI unit, priced at $5,500, features optional dial backup and self-testing capabilities including digital or analog loopback of remote unattended units. The operator can perform both local and system diagnostics and can select all mark or all space transmission. The automatic equalization device features four front-panel switches and nine LED indicators, including one to signal when the telephone line is degrading.

Infotron is at Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

Data 100 Users Gain IBM 3776 Emulation

MINNEAPOLIS — Data 100 Corp. has announced a software package that allows appropriately configured systems to emulate an IBM 3776 remote batch terminal with Binary Synchronous Control (BSC) line protocol.

The package can be used on any Data 100 remote batch terminal system equipped with a keyboard/CRT terminal, 4,800 bit/sec BSC communications and one system and one data diskette, according to a spokesman.

Optional peripheral equipment reportedly includes a second data diskette; interface compatibility with synchronous communications at a rate of up to 19.2k bit/sec; card punches; card readers operating in the 150 - to 1,000 char/sec range; and printers in the 125 - to 1,250 line/min range.

The data diskette can be used to read and write data to the communications line and other systems peripherals, Data 100 said.

Information received on the line can be defined in either printer, punch or diskette.

The system diskette can store and execute a number of communications functions, job procedures and data set tasks and display operator statistics, he added.

System messages are displayed in English on a full-screen CRT rather than as three-digit numerical readouts for operator interpretation.

The package is available immediately at no charge from Data 100 at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

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Code Conversion Offered as Option For Terminal

CAMPBELL, Calif — A code conversion option for the Data Terminals & Communications, Inc. (DTC) Model 382 provides operator switch-selection of Ascii, BCD or correspondence line codes.

The firm said the option introduces the following features:

- IBM 2741 emulation in BCD or correspondence codes.
- Data transmission rates from 110-to 9,600 bit/sec in all codes.
- Line turnaround buffer (type ahead).
- Automatic log-in in the end-of-address.
- Missing end-of-address.
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- Normal Ascii operation.

The option costs $200, DTC said from 590 Division St., Campbell, Calif. 95008.

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Easier for Student Operators

College Goes Diskette, Saves $10,000

By Roy James Parrish Jr.
Special to CW

DANVILLE, Va. — Danville Community College (DCC) has implemented a cardless computing environment for its instructional programs through the use of key-to-diskette units. While the use of diskettes for data entry is by no means unique, it is relatively rare for an educational environment. Almost all administrative applications of the college have also been converted to diskette input.

DCC is located in southern Virginia and has an enrollment of approximately 2,000 students. Computing service for the college is provided locally through an IBM 3776 terminal consisting of a card punch, 50 card/-min card reader, 300 line/min printer and two diskette readers.

This batch terminal is on-line to dual IBM 370s at a consolidated computing center operated by Virginia Commonwealth University and the Virginia Department of Community Colleges in Richmond.

The primary academic use of DCC's computing facility involves batch processing of jobs for students enrolled in programs offered by the Division of Business Sciences. A two-year Associate in Applied Science degree in DP technology is offered; the normal enrollment for this degree is approximately 50 students.

In addition, all students enrolled in the "Principles of Accounting" course use an instructional accounting package developed at the college. About 200 students take the accounting course at any given time.

All business division programs require the introductory course in DP, which places an additional load on equipment. Statistics, engineering and drafting courses also require use of computing facilities, but to a lesser degree.

Prior to installation of diskette-type equipment, DP hardware at DCC consisted of traditional keypunch machines (IBM 129s), with jobs being submitted in batch mode to the consolidated center through an IBM 2780 terminal. Last year, the decision was made to upgrade the existing hardware by replacing the 2780 and 129s with the IBM 3776 terminal and IBM 3742 key-to-diskette units. This change has reportedly resulted in improved operations and a considerable cost savings.

For example, replacement of the 2780 with the 3776 resulted in a savings of $1,956/year in rental costs. In addition, six IBM 3742 dual data stations provide 12 data entry stations at a cost of $14,040/year, while the same number of keypunch stations would cost $22,264.

Data Entry Dimensions

Therefore, the switch to the diskette as a data entry medium has reduced the cost of data entry equipment by $8,424/year and batch terminals by $1,956/year, resulting in an annual hardware savings of $10,380 on these two items.

Better Transmission Operations

Diskette usage has improved data transmission operations significantly, according to college spokesmen. During a typical month of the academic year, more than one million cards (or card images) may be transmitted to the consolidated center. The

(Continued on Page 41)

Utility Links OCR Units, CPU; Quickens Remittance Processing

INDIANAPOLIS — A utility here that handles 200,000 customer payments a month has found moving to optical character recognition (OCR) for data entry provides it with improved turnaround times compared with earlier key-entry methods.

Citizens Gas and Coke Co. has linked two Burroughs Corp. S1800 OCR processing systems directly to its Burroughs B3700 mainframe. Operational studies of the remittance-processing system have shown several benefits, according to Paul McClellan, director of accounting for the firm.

These include improved customer relations because the files are updated more quickly, permitting operators to answer customer questions more accurately; same-day verification of cash; and more timely bank deposits, he said.

Cycle billing for the firm's 200,000 customers results in an average volume of 10,000 payments a day, with a peak of 15,000 transactions on certain days, McClellan noted. On the average, 48% of payments come by mail, 43% are from agencies (banks where customers pay bills) and 9% are over-the-counter or from Citizens' night depository.

Bills sent to customers are produced by a Burroughs line printer in OCR-A type font. A scan line on the front of the bill contains a control code, the customer account number and the payment amount.

In the remittance-processing operation, mail returns (bills and checks) are sequenced and fed automatically on the S1800s. The system reads and stores information from the bill. Each transaction is proved individually, eliminating the need to balance by batches, McClellan said.

The electronically endorsed audit trail on the backs of the documents contains sequence numbers, dates processed, amount paid and the customer's account number. This account number on the back of the check significantly reduces research time on any check returned by a bank for any reason.

Customers paying bills at agencies make checks payable to the bank, and totals are credited to the utility's accounts. Deposit slips and bills are returned for processing. Bundles are read by the S1800s, information is captured on cassette and totals are proved against deposit slips.

Over-the-counter and night depository payments are treated as agency payments, McClellan said, with cutoff times for the cashier area of 9 a.m. and 2 p.m.

"Early timing studies of the S1800s indicated the systems were performing up to or exceeding our original estimates," McClellan said. "At the time of early studies, the systems were processing an average of 3,700 agency items an hour and 887 mail returns an hour."

Bob Eberg, manager of DP for Citizens, said transmission of data from S1800 cassettes to the B3700 four times a day "is an efficient technique that minimizes contention for the B3700's processor time, especially since we have several on-line terminals and applications on the B3700 are closely scheduled."

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With Few Performance Problems

Service Bureau's Add-On Quest Ends Happily

By a CW Staff Writer

SAN FRANCISCO — Rand Information Systems, Inc. is a service bureau which provides language conversion services and sells a teleprocessing system for order entry. With a work backlog presently estimated at $7 million to $8 million, the company can't afford to have its system down for long.

Several years ago, in an attempt to save money, the company installed an add-on memory system from an OEM vendor. Although the memory unit (whose maker the company declined to identify for publication because of a pending suit) worked fine for the first six to eight months, it began to fail thereafter. The performance of the add-on became intolerable, according to Charles Harbour, Rand's data services operations manager.

"The memory would constantly fail. It went down too frequently for us to tolerate, and when we called for service, the response time was far too slow. In addition, it was inadequate; a person would be sent out to pacify us four or five hours later, and he wouldn't be able to solve the problem," Harbour noted.

To remedy this situation, Rand began to look for alternatives and considered in the process, American Micro Systems, Inc., Electronic Memories & Magnetics Corp. and Intel Corp.

After evaluating the alternatives, the company was almost convinced the add-on memory from Intel's Commercial Systems Division would meet its needs. However, it was unable to find a system compatible with its own that also had Intel memory attached, so "a reference check of users helped in selecting Intel," Harbour explained.

Acceptance Tests

To avoid doing benchmarks, Rand had decided to conduct acceptance tests before officially accepting the system. "We thoroughly tested all our applications and then compared the time and cost of running several jobs using Intel's memory and using ours." According to Harbour, "the results were approximately identical."

Rand uses an IBM 370/158 with 6M bytes of real memory to process its own work and to service outside time buyers. Several single- and double-density disk and tape drives, an IMS port, several telecommunications devices and a dual Computer Communications, Inc. CC-8 telecommunications controller complement the hardware, which runs under MVS release 3.7D. The installation also uses TSO and Tcam for telecommunications control.

Harbour finds the company's latest add-on memory far superior to the earlier product. "Overall, we are satisfied with Intel's performance. When we do experience an outage caused by Intel memory, its service people have been able to diagnose the problem and repair it very quickly.

"We are in the type of business that requires a high uptime — more than 90% — because we are on-line and [with the older add-on unit] we were constantly showing outages. It got to the point where we couldn't tolerate it any longer," Harbour said.

The operations manager feels the advantages of Intel's product, in addition to saving his company money, are better fault diagnosis and increased throughput. "The increase in throughput is primarily because its memory capacity can go up to 8M bytes whereas memory from the other add-on vendors and IBM will only go up to 4M bytes."

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Stand-Alone Handles Distributed Data Entry

MELBOURNE, Fla. — Optical Business Machines, Inc. (OBM) has announced the Laser OCR-One for distributed data entry applications.

The system is a stand-alone DP facility consisting of software and various hardware modules that can be interconnected to construct a processing system tailored to a user's needs, according to a spokesman.

The Laser OCR-One can capture source data, edit and check input data, update and maintain files and generate output files and/or reports relating to the processes that have taken place, he said.

The basic system configuration consists of a central processing module, 10M-byte disk drive, CRT terminal, Laser OCR-One optical character recognition (OCR) reader, a desk-type cabinet and supporting software.

Options are available to enhance the processor and scanner, as are additional 10M-byte disk drives. Also available are the PB-600 matrix printer and floppy disk subsystem.

The basic software includes a multitasking disk operating system, assembler and utility programs. Additional available software includes applications packages, a Fortran compiler, RPG-II, Cobal compiler, Basic, Isam and Itam.

An accounting system can be put on the Laser OCR-One, OBM said, that will allow the user to do the following:

- Handle the capture of employee time records for file updating and generation of paychecks.
- Capture vendor invoice data to update an accounts payable file and then generate payment checks to vendors.
- Capture information pertaining to sales activity so an accounts receivable file is updated and generate periodic reports showing the status of all receivables. The file can be used for generating invoices.
- Consolidate financial operations of the user's business and generate the usual reports with a general accounting module.

A basic system costs $135,000, the firm said from 804 W. New Haven Ave., Melbourne, Fla. 32901.

Diskettes Save for College

(Continued from Page 39)

amount of operator intervention required in the transmission of this volume of records has been greatly reduced by transmitting directly from diskettes, and dropped card decks and the problem of continuously reloading a card hopper on large jobs have been eliminated.

However, the switch from cards to diskettes was not made without some misgivings about the compatibility of diskette usage with an academic environment in which many users, primarily students, are not trained data entry operators. These misgivings were heightened by a failure to locate any other user of diskettes in a student-oriented, academic environment.

DCC found, however, that IBM 3742s can be operated as easily by nontrained personnel as keypunch machines. Operating instructions have been listed in exact steps for the non-DP student.

Some Drawbacks

While there are many advantages derived from using diskettes in an academic environment, there are also some drawbacks. The student must insert the diskette into the IBM 3742 in order to perform any action (look at or change a record). A problem arises when all units are occupied by students keying long jobs and another student wishes to change one record; however, much the same problem exists with keypunches.

This problem has been alleviated to some extent by designating one workstation for use in making corrections only, thus allowing the student with minor corrections to have access to a data entry unit.

The major shortcoming of diskette use involves insertion of records into an existing data set. The 3742 moves records forward from the point of insertion, leaving room for the desired number of records to be inserted.

If the insertion is to occur near the beginning of an extremely long program, several minutes may be required for the movement of records before the insertion can be keyed.

The reusability, simplification of operation procedures, ease of use by non-DP students and cost savings provided by using diskettes as an input medium have validated the decision to switch from card to diskette input at DCC. The continuing decline in the cost of diskettes adds additional weight to this decision.

While a savings of approximately $10,000 may be the proverbial "drop in the bucket" to a major installation, this amount represents a significant percentage of funds allocated for DP hardware at DCC.

Parrish is associate professor of DP technology at Danville Community College.

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- **Where to get reports** on on-going government-sponsored research projects.
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In response to a recent policy shift by OFPP on unsolicited proposals, Mercury Communications has released this new updated edition of *How to Create a Winning Proposal*. The new edition details current requirements for preparing and submitting unsolicted proposals to Uncle Sam. Included is an explanation of the new regulations concerning government acquisition, contracts, grants and awards.

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Printers Speed Daily Reports to Caseworkers

LANSING, Mich. — The state's Health and Welfare data center here has turned to a nonimpact printing system to help it produce the thousands of daily reports needed by caseworkers throughout the state.

The center serves thousands of caseworkers in three separate departments in the state — Public Health, Mental Health and Social Services — with centralized DP services.

Since their installation two years ago, the two Honeywell, Inc. Page Printing Systems (PPS) used by the center have taken over a large percentage of the printing load from the center's impact printers, according to a spokesman for the department.

Paper Savings

"We knew we needed a better means of getting printed computer reports to our staff," William Nash, director of the data center, explained.

"We saw the PPS and decided to rent two of them," Nash remarked. "The additional rental of equipment has been more than justified by paper savings alone. Two PPS are doing the work of seven or eight impact printers."

The systems at the data center produce reports for two categories of caseloads. The Client Information System (CIS) contains data on welfare applicants and recipients, and the Michigan Medical Information System (MMIS) covers Medicaid and Medicare claims.

Caseworkers and administrators benefit by speedily receiving regular reports of their accumulated efforts and by getting faster response to their special requests for printed data from the computer system, according to data center officials here.

Easy to Store

Joel Heilman, director of systems development for the data center, said the PPS reports are easy to handle because they are cut to size and have holes punched within the PPS, making them easy to place in ringbinders and file cabinets.

"The PPS reports have been welcomed by all levels of the departments we serve because they are easy to store," Heilman remarked. "They have an added value because every page is an original with high legibilty.

"With our old impact printers, we made from one to several carbon copies of each page. The top page is usually clear but when you get to the carbons, they can be smudged and hard to read. The PPS eliminates that problem."

The data center deals with requests for assistance, inquiries about welfare eligibility and changes in the status of welfare recipients.

Continuous Updating

In the current CIS file, there are 1.2 million recipients' names that require continuous updating. Another 700,000 names are in the inactive file.

The data center processes an average of 85,000 transactions daily from outlying district offices of the departments it serves. These transactions relate to information on welfare applicants or recipients.

In addition, some 50,000 medical invoices must be processed each day under the Title 19 Medicaid program.

The Department of Social Services has 8,000 social workers in 83 countries, and the data center, which operates within a $20 million annual budget, employs 600 people, including 125 analysts and programmers.

The center's data base can produce all stored information on an individual upon command.

Printing Time Slashed

Bill Griffith, director of operations at the data center, noted that the PPS has cut printing time from hours to seconds in some cases. "Under Medicare, we handle hundreds of thousands of requests to pay drug prescriptions," he explained. "Every day we must process and prepare to mail a large report on these requests.

"With our impact printing system, it took one to three days to take each report through the stages. With PPS, we accomplish the same project in four hours," he noted as an example.

The capability of the PPS to print forms at the same time as data eliminates the need to purchase preprinted forms and makes possible on-the-spot form changes by programming the PPS, Griffith observed.

Information for reports produced by the PPS is fed into the nonimpact printer on magnetic tape prepared by the data center's master computer operation. The tape contains a control block for each job, giving it parameters that govern the printing process.

Ready-to-Mail

"We're saving a great deal of time and money because we purchase rolls of blank, treated paper and roll-feed it into the PPS," Griffith explained. "The control block tells the PPS what size finished product we want, how many copies, how many punch holes and on which side of the paper the punch holes should go. We watch it come out with every copy a ready-to-mail original.

"Before this, we took a great deal of time separating carbons and folding reports to fit into envelopes. With the volume we handle, elimination of any step means large cost savings. The PPS accomplishes many print shop steps at once," he said.

The data center uses a Honeywell Series 6000 quad processor 6080 with five front-end network processors. Linked to the quad processor are 53 tape drives and 70 disk drives. The system has 1M byte of MOS memory and is linked to approximately 400 CRTs throughout Michigan.

Trial Sample

Griffith explained that he sent a trial sample of the PPS printouts of computerized health and welfare data to district offices before starting to use the PPS on a regular basis.

"I got instant favorable response," Griffith remarked. "Our users are so happy with the PPS output that we couldn't revert to the old method.

"These printouts are much easier to handle, read and store."

The data center's two PPS, which have their own minicomputers, currently run at 12,000 lines/min. They have the capacity to print 132 char./line at 4-, 6-, 8-, or 10 line/in., and they can cut paper to 14 different lengths, Griffith noted.

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Mini Bits

Media, Supply Vendors Graded in User Survey

DELRAN, N.J. — Caelus Memories and Wright Line, Inc. have earned the highest user ratings in their respective product areas following a Datapro Research Corp.'s survey of DP media and supplies customers.

On a scale of one to four — with one representing the lowest score and four the highest — Caelus led the field of disk pack, module and cartridge vendors with an average user rating of 3.8, while Wright Line topped the list of diskette and minidiskette suppliers with a perfect 4, according to Datapro.

In the disk pack and cartridge sector, 3M Co. placed a close second to Caelus with an overall rating of 3.7, while BASF Systems, Inc., Control Data Corp., IBM and Nashua Corp. all ranked third with 3.6, Datapro said. 3M also finished second in the user ratings of diskette and minidiskette vendors. The St. Paul, Minn-based firm scored 3.7, compared to Memorex Corp.'s 3.6 and IBM's 3.5.

These and other survey results appear in Datapro's feature report "All About EDP Media and Supplies," which also rates suppliers of cassette/cartridge tapes, printer forms and ribbons and punched cards. At a cost of $12 per copy, the report is available from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

Units Let HP CRTs Yield Hard Copy

AUSTIN, Texas — Any of the Hewlett-Packard Co. 2640 series CRT terminals equipped with HP's 13254A interface can reportedly output hard copy when linked to the first two members of Houston Instruments' 8600 series CRT copiers.

Designated Model 8640 and 8640A, the two copiers use two rows of styli with overlapping dots to produce hard copy in 10 seconds, according to a Houston Instruments spokesman.

When used with electrostatic paper, the 8600 series units can reportedly yield copies of CRT output for one-third the cost of copiers using dry silver paper.

Models 8640 and 8640A cost $4,495 and $4,995, respectively, and are available from the firm of One Houston Sq., Austin, Texas 78753.

Correction

A story about the Seventh-Day Adventists' use of a Wang Laboratories, Inc. minicomputer [CW, Oct. 9] mistakenly carried a photo of two employees of Trans-Air Forwarding and Brokerage, Inc., also a Wang equipment user. The two men were misidentified as Adventist programmers.

Tighten Control of Minis Or Risk Crime, Users Told

By Harry Zimmerman
Special to CW

Minicomputers are inherently more vulnerable to DP crime than standard computers because the three principal protections — division of labor, limited user access and printed audit trails — that are relied upon in standard computer environments are often not realizable or practical in minicomputer installations.

Here's why those precautions are not applicable:

- A mini site usually is too small to economically institute a division of duties for operating personnel.
- Ease of use is a minicomputer selling feature that is compromised when access is limited only to specially trained staff.
- Printed records for audit trails of processed transactions are unprotected and can usually be destroyed without trace.

Many computer professionals and knowledgeable auditors attribute the relatively low rate of minicomputer-related crime to the fact that so many user staffs and potential criminals are not sophisticated enough to attempt embezzlement. The latent thief does not know how easy it is to commit larceny.

It would appear to be quite easy for a minicomputer user to be "taken" since his "till" is open and unprotected. Possibly it is only a matter of time before user staffs become more sophisticated and we begin to hear more about minicomputer-related crime.

Fortunately, users can take steps to discourage minicomputer crime, and we need not depend upon chance or the implicit honesty of staff members. These precautions include physical access restrictions, program and data file access restrictions, control totals and variance tests.

- *Physical access restrictions.* Minicomputers are often situated in a user area such as a warehouse, receiving platform, accounting department or office area. Wherever practical, minicomputers or minicomputer terminals should be located in a locked room that does not permit general access.

Hardware vendors and users should not overlook the need for limited access in designing installations but this neglect appears to be occurring.

When a machine or terminal cannot be kept in a locked room, the unit should have a key lock similar to that found on automobile ignitions. Keys should be issued only to authorized staff, and most important, they must be used and the devices locked when unattended.

- *Computer program and data file access restrictions.* Most minicomputer manufacturers provide software for security passwords. Assignment of these passwords should be restricted to authorized personnel who need to access sensitive programs. For

(Continued on Page 48)

Low-End System Acts as Node In Industrial, Lab Networks

By Jeffry Beeler
CW Staff

FORT LAUDERDALE, Fla. — Just as some small business computers can provide remote processing power in commercial systems networks, so the latest addition to the Modular Computer Systems, Inc. (Modcomp) Classic family provides distributed intelligence in industrial automation and scientific communications networks.

Compatible with all members of the Modcomp II series and some of the company's other minicomputer systems, the Classic 7810 constitutes a low-end addition to the Classic line, which previously consisted of just two models — the high-end 7860 and 7870 systems.

Although the 7810 has limited usefulness as a stand-alone unit, the product serves primarily as a node in distributed processing networks using 7860 or 7870 superminis as hosts, according to a Modcomp spokesman. When operating in a network with the company's recently introduced standard link I/O controller, the low-end system communicates with its hosts in either the High-Level Data Link Control or Synchronous Data Link Control protocol.

Typical customers of the 7810 will use the system for measurement and control in applications like engine testing, energy management and scientific computation, the source explained.

Modcomp places the system in the same product class as the Digital Equipment Corp. PDP-11/04 and the Data General Corp. Micronova and Nova 3. But unlike its DEC and DG rivals, which accommodate a maximum main memory of 64K bytes, the 7810 holds up to 128K bytes, the spokesman noted.

Modcomp also credited the system with providing twice the price/performance of the Model 2 and other low-end members of its Modcomp II systems series.

(Continued on Page 44)

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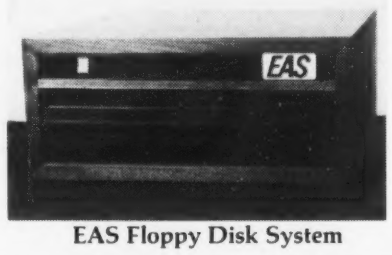
EAS Dual-Drive Floppy Holds 250K Byte/Drive

LEDGEWOOD, N.J. — Up to 250K byte/drive can be accommodated by the Electro Analytic Systems, Inc. (EAS) dual-drive floppy disk unit, which accesses in 211 msec (average) and in 8 msec (track to track), according to an EAS spokesman.

In addition to the two 8-in. Shugart Associates SA800R or SA801R diskette units, the EAS system incorporates a Tarbell controller, which accepts up to four drives and uses a controller chip and on-board programmable read-only memory for the operating system.

Compatible with the Z80, 8080 and other microprocessors, the diskette system provides a disk operating system as a separate module.

The EAS floppy diskette unit, which holds 3.3K byte/track, costs $1,995 and is available with a 90-day warranty from the company at Box 102, Ledgewood, N.J. 07852.



EAS Floppy Disk System

System Performs as Node In Industrial Networks

(Continued from Page 43)

Unlike the 7860 and 7870, the 7810 uses no virtual operating system and provides no memory mapping or floating point capabilities, the source said. The system also incorporates a traditional 16-bit architecture, whereas the high-end members of the Classic line use a mixture of 16-bit, 32-bit and 64-bit words.

To permit communications with hosts in a distributed processing network, the 7810 uses much of the same software as the 7860 and 7870. For example, the low-end system accommodates Max II, a batch operating system also used by the 7860, and Max III, a realtime operating system for processors incorporating 128K bytes of main memory or less.

Requiring a minimum main memory of 64K bytes expandable in one or two 32K-byte increments, the 7810 comes in three versions — an unadorned CPU board that OEMs can incorporate into larger designs, a basic 7810/2 configuration and a fully packaged system.

In its basic form, the system consists of a CPU and chassis with integral power supply, cooling system and up to three console disk controllers. As a fully packaged configuration, the system typically incorporates one to four of Modcomp's 10M-byte disk units and up to 16 of the company's CRT terminals.

The 7810's processor operates with a 600-nsec memory cycle, provides 15 general-purpose registers and uses the same set of 169 basic instructions as the Modcomp II series.

As a board-level processor with a 64K-byte MOS memory, the system costs $3,250; as a basic 7810/2 configuration, $7,500. With a 10M-byte disk unit and a CRT terminal, a packaged system sells for about $26,000.

Deliveries of all three versions start next year during the second quarter from Modcomp at 1650 W. McNab Road, Fort Lauderdale, Fla. 33309.

Cartridge Transport Unwrapped by DEC

MARLBORO, Mass. — A cartridge tape transport system from Digital Equipment Corp. reportedly stores 256K byte/cartridge and records data in block-addressable form.

DEC credited the TU58's recording technique, which is said to be usually associated with floppy disk systems, with allowing users to replace blocks randomly without disturbing previously recorded data. Many other tape units in the TU58's price class, by contrast, store data in variable positions and thus complicate data replacement, a DEC spokesman explained.

Using DEC's DLV11-J interfaces, the system transmits full-duplex, serial data asynchronously at 150- to 38,400 bit/sec to the company's LSI-11 or its packaged version — the PDP-11/03.

In quantities of 100, the system costs $446 per unit, with additional orders costing $116 in quantities of 100. Volume shipments begin this fall from DEC's Components Group at One Iron Way, Marlboro, Mass. 01752

EDP professionals have a word for the new Wang VS computer.

Richard Berger, Vice President and Data Processing Manager, Bughaus, Inc., a Volkswagen service center network headquartered in Hartford, Conn.

"Because we had been using a computer—the Burroughs B1700—with card input sequential files and no video displays, we suffered long delays and storage constraints.

"Now, with our Wang VS system, storage is virtually unlimited, and we simply recall a screen load of information on the CRT to make a change in seconds—all of this without interrupting our normal flow of work.

"We've put everything in our business onto our VS system, including payroll, accounting, sales and wholesale and retail inventory control. And we did it in 90 days without changing languages and with only minor modifications in almost 90 COBOL programs."

"We are absolutely amazed at the throughput rate we've achieved with our Wang VS. On our very first job for one of the country's largest student insurance agencies, the VS arrived in Pittsburgh on December 23 and was completely installed and operational on-site on February 15, with 61 programs written, debugged and tested—all by only two people—and not a single line of code had been written until the machine came in the door.

"The VS really fulfills all of our requirements, particularly in areas where other systems are weak: cost/performance, language-availability, user-utility software.

"I think the real key for the DP manager is the utilities available with the VS, its speed and its interactive COBOL compiler. These three things combined make for a very powerful tool."

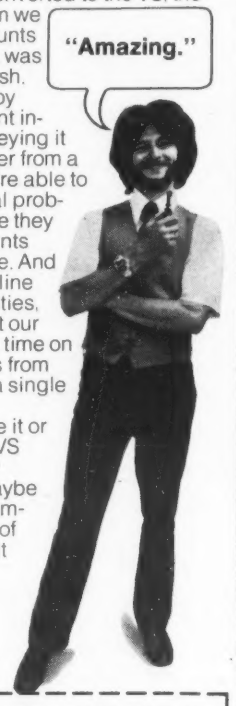
J.P. Scott, Data Processing Manager, Aptech Computer Systems, Inc., Pittsburgh, Pa.

Kenneth W. Cakebread, Manager of Data Processing, Trans-Air Forwarding and Brokerage, Inc., Inglewood, Calif.

"I had 30 days to convert about 220 programs from our old batch-oriented Honeywell 62 system to our new Wang VS system. Not only did I do it: Thanks to the programming power of the VS, I actually came up with more.

"Before we converted to the VS, the biggest problem we had in the accounts receivable area was misapplying cash. No more. Now, by capturing current information and keying it into the computer from a workstation, we're able to sort out potential problems long before they get to the accounts receivable stage. And with Wang's on-line editing capabilities, I'd say we've cut our average editing time on a per-item basis from 30 seconds to a single second.

"And believe it or not, while the VS gives us faster access and maybe triple the programming efficiency of our old system, it was only half the cost."



EDP professionals in more than 100 companies are singing the praises of the Wang VS. And for good reason.

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The VS provides for distributed data processing, thus avoiding costly consumption of mainframe resources. It's fast, responsive, ease to use and can support up to 2.3 billion bytes of on-line storage. What's more the VS speaks EDP people's language: COBOL, BASIC, RPG II and ASSEMBLER.

We also think you'll appreciate how simple the VS is to operate. In fact, because of its level of sophistication, it can be operated by people with little or no computer-related training or experience.

One more thing: the entry level price of the VS is under $50,000. Which is perhaps the most remarkable thing of all about this computer.

For more information on the VS, return this coupon to Wang Laboratories, Lowell, MA 01851.

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Mini Turns Firm's Data Snags Into Smoke

By Marcy Rosenberg
CW Staff

WINSTON-SALEM, N.C. — By substituting two small computer systems for a time-consuming manual filing method, a tobacco company has speeded access to production data in its machine shop, which makes spare parts for cigarette production equipment.

The Hewlett-Packard Co. 1000 systems allow R.J. Reynolds Tobacco Co. to track in real time the location and status of jobs in the shop by displaying route sheets on a CRT terminal, according to John Wall, computer systems and group leader for the cigarette manufacturer.

Under the previous manual routing method, Reynolds personnel tore small tickets from a route sheet and posted them as each task was completed. As a result, 1,000 to 2,000 pieces of paper circulated through the shop daily. To determine the status of a given job, the firm had to find the last torn ticket after first looking up the job number.

Besides being time-consuming, the old method did not permit statistical analyses of workload, produce management reports or monitor shop performance, Wall noted.

"The computer systems," he said, "can compare in about 20 minutes the hours needed to produce a part at any time this year to data for similar jobs within the past three years. With the manual filing system, this could have taken months."

Other information processed in batch mode and available to managers includes weekly progress reports indicating shop workload, data on manpower and raw materials needs and biweekly reports of overdue orders.

Numerical Control Tapes

Besides providing data for shop management, the systems generate numerical control NC tapes for Reynolds' growing number of NC-operated machine tools. Previously the company used a Singer Business Machines Model 2301 Flexowriter to produce the NC tapes, "which was a manual method and slower," according to Wall.

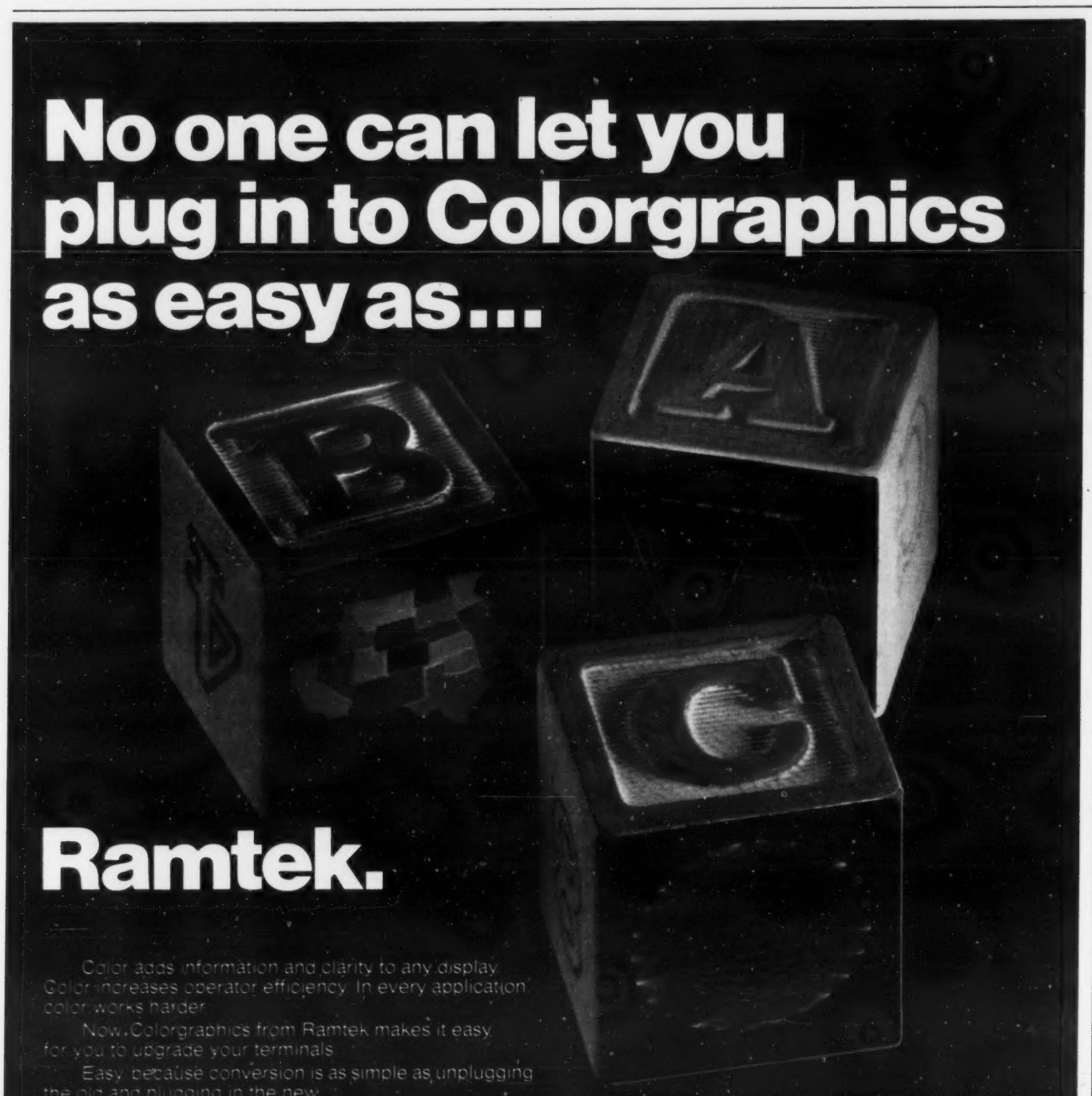
As the firm began to add more NC equipment, "we considered buying another Flexowriter but decided in favor of a computer system, which could not only make tapes but also produce and analyze information for the machine shop."

Both HP1000 systems store 64K words and incorporate a 15 M-byte disk system and 1,600 bit/in. magnetic tape unit. Other hardware includes a paper tape reader and punch, a flat-bed plotter, card reader, line printer and two teleprinters for I/O and punched tapes.

When it originally considered buying a computer system, Reynolds did not want to have to develop its own software. The firm considered the Digital Equipment Corp. PDP-8 and Honeywell, Inc. 2020 systems but chose the HP models because of their Image/1000 data base management software and Query language.

With Image software, Wall explained, "we can put route sheet information on the computer and have the on-line production control we want."

In another application, the firm's engineering department has started within the last three months to use three HP terminals - two Model 2645s with tape cassettes and one Model 26 154 — to determine its project costs.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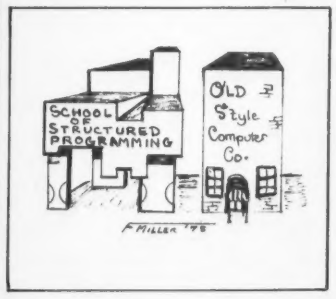

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WESTLAKE VILLAGE, Calif. — Designed for the Motorola Exorcisor I, Exorcisor II and 6800 evaluation modules, a semiconductor memory from Chrislin Industries, Inc. expands in 4K increments to a maximum of 64K bytes.

Users can expand the CI-6800 by exchanging its 4K by 1 Model 4027 memory chip with its 16K-bit equivalent.

A 16K by 8 version of the product costs $390; a 64K by 8 version, $995.

Chrislin Industries' Computer Products Division is located at Suite 102, 31312 Via Colinas, Westlake Village, Calif. 91361.

Users Warned to Tighten Mini Controls

(Continued from Page 43)

example, a payroll supervisor should be the only one given a password to access a payroll file maintenance program which is used to change pay rates.

The changing of pay rates should be a protected function performed by a payroll supervisor who has been entrusted with the correct password. A second person, such as a controller in a small company or another supervisor in a large company, should have access to this program as a backup precaution.

Similarly, password access can be placed on computer files or specific records in files or libraries. Only an authorized person with the correct password, for example, can query the files for pay rates of employees or other sensitive data. The procedure should include a user list with different passwords for each authorized user in the security system.

In an installation with several terminals or stations, it is often possible to limit queries of sensitive files to the systems or main control station. A user operating a terminal or station on a receiving platform for example, would not be able to access the protected, sensitive files.

Attempted access to the protected programs, files, libraries or data fields would trigger a display of error messages and a processing halt. With some systems, it is possible to log successful accesses and periodically print the log for scrutiny. Such an audit trail is always welcomed by DP auditors.

• *Special control totals.* Control totals are customarily used to ensure input accuracy. However, establishment of "hash" control totals on the pay rate of every active employee in the file can be useful as a security measure.

The basic concept of hash totals is far from new, but it is now more important because of the absence of other safeguards to data and files. Procedurally, the correct hash control total is maintained by the authorized payroll supervisor.

Whenever payroll is processed, the individual employee pay rates should be accumulated and the total printed on a payroll register. The payroll supervisor can examine this printed total to ensure it is correct.

Similarly, in an invoicing system that maintains the selling prices of product numbers in the file, a hash control total of the accumulated selling prices can be established. Whenever the system calculates invoices, it can also accumulate the product selling prices as a hash total. Fraudulent charges could be detected because the hash total would be incorrect.

If a potential perpetrator were aware of the hash control, he could alter the selling price — to favor a chosen customer — and make a compensatory change to the selling price of another product that is sold infrequently to keep the hash total correct.

Knowledge, therefore, of the application of this technique, must be restricted. Obviously, hash totals should not be considered foolproof.

• *Variance tests.* In special situations variance tests can be quite effective. Consider an example in which the selling price is reduced for a customer. The system can provide a monthly detailed sales journal that includes a test and an exception flag for a deviation from a given percentage markup.

The person of authority reviewing the report will be alerted by the deviation and can have the actual invoice examined. A possible loss would be avoided by issuing a corrected invoice.

This precaution also is not foolproof. If a thief knew about the deviation test, he could thwart it by correctly altering the product cost used to calculate the ratio. Obviously, it is advisable to restrict knowledge of this control.

Necessary Bother

Many of the procedures described here can be bothersome to minicomputer users. Locked doors and key locks get in the way. In practice it is often difficult to keep passwords private. Therefore, they should be periodically changed. Passwords have even been written on blackboards for easy reference.

Hash totals are easy to use and effective if the number of changes are reasonable. The variance test is completely nonoffensive. It is operated programatically and rarely requires attention and intervention.

It would become ineffective if the number of legitimate deviations were excessive because a reviewer could not take the time to examine each flag.

For adequate protection, minicomputer users must avail themselves of a judicious selection of available safeguards. Just as insurance is necessary and has a cost, these safeguards are necessary and incur costs.

Zimmerman is manager of management advisory services at Wiss & Co., an E. Orange, N.J., accounting firm.

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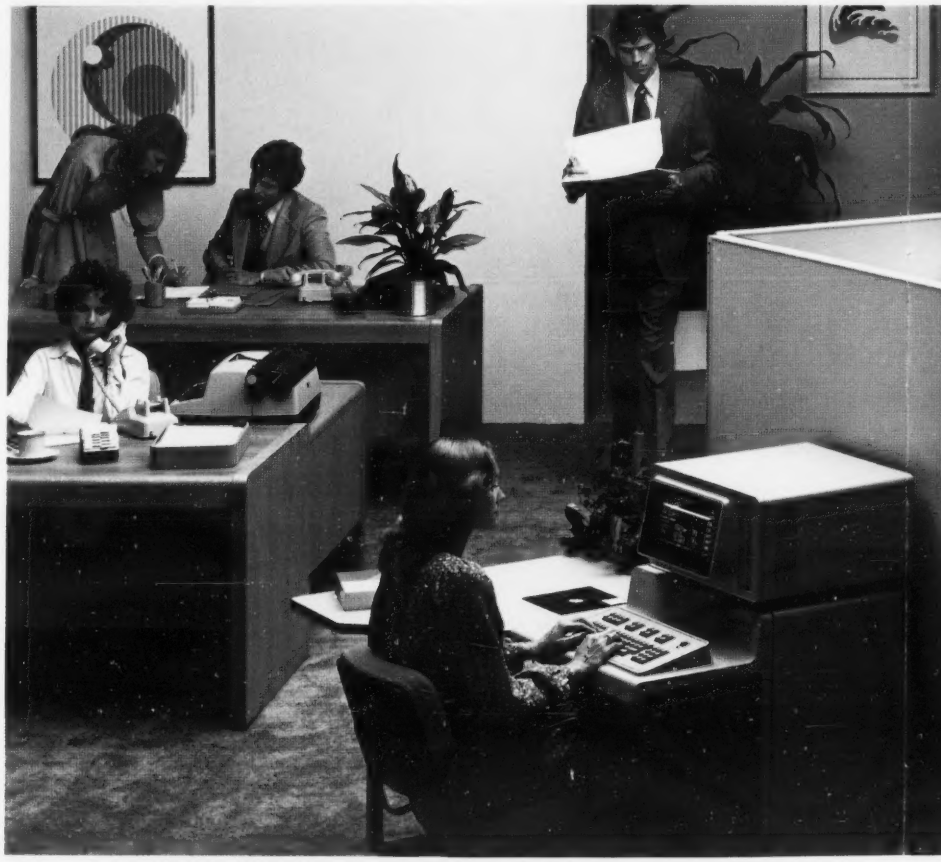


Looking at data through multiple 'windows.'

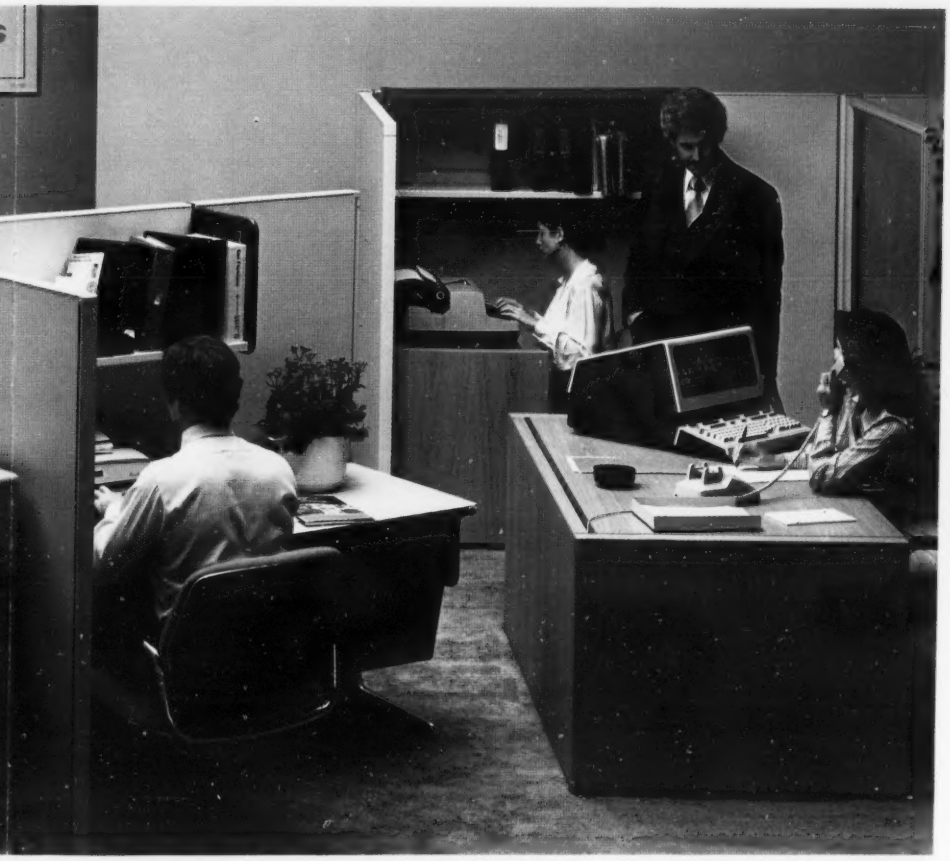
The screen can be split into several windows to display and control various aspects of one or more applications. You can also scroll each area horizontally or vertically—up to 160 columns wide and several thousand lines long.

One window can even be used to label eight 'soft keys' at the right of the screen. These lead the user step-by-step through each job.

The IDS is your window on thousands of transactions. In a large company, they might all be concerned with a single task, like order entry. In a smaller business they could cover the entire range of data processing, from displaying the latest sales figures to managing the inventory.

PRODUCT INVENTORY INQUIRY
ITEM # DESCRIPTION UNIT PRICE U/M QTY ON-HAND
000238 Die Stocks 475.00 EA 10
00106A Medium Duty Casters 45.95 EA 1000
019B8C Wrightson's Air Filters 36.95 EA 45
02004F V27A Support Sheeting 358.86 PKG 10
020130 Forthright Gaskets 26.00 DOZ 3
02015A Ruffwood Keyseat 175.00 EA 5
02015B Ruffwood Keyseat Cutter 26.00 EA 5
02045D Keyway Bushings 45.00 PKG 24
020735 Carbon Steel Hex Nuts 525.00 CASE 10
021360 Dago Block 35.00 EA 2
021A0E Pneumatic Wheel Set 234.50 EA 1
... DETAIL INVENTORY INFORMATION ...
ITEM # UNIT PRICE U/M QTY ON-HAND VALUE ON-HAND USE/MO.
020130 $26.00 DOZ 3 $78.00 5
UNFILLED QTY ORDERED ORDER # EXPECTED VENDOR
9/17/79 50 331-345 1/30/80 Forthright Mfg.
SHOW DETAIL
UPDATE ITEM
ORDER HISTORY
CUSTOMER ORDERS
VENDOR STATUS
SCROLL LOWER WINDOW
PRINT
EXIT

The HP 300.



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The AMIGO/300 operating system was designed from the ground up to simplify writing and using dedicated on-line application programs. It supports two business languages—RPG II or Business BASIC. And six different file structures (including keyed sequential), IMAGE data base management, plus an English-like inquiry facility, all help to shorten program development time.

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Guide Geared to Novices

Look Beyond Price Tags, Users Warned

By Ann Dooley
CW Staff

CHERRY HILL, N.J. — First-time users of microcomputer systems should not be swayed by the low price of small business systems but must consider other factors before making a purchase decision, according to a new publication by Management Information Corp. (MIC).

Entitled *Personal Computers for the Businessman*, the publication explains what a microcomputer is and outlines the differences between a micro- and a minicomputer.

Many businesspeople are becoming interested in microcomputers because of their capabilities and low cost but know little about them or what to look for when buying a system. Much of the computer "jargon" is unfamiliar and leaves the businessperson confused and often stuck with a micro system he purchased but which does not really suit his needs, the report indicated.

The publication is intended to help these businesspeople ease their way into the world of microcomputers as opposed to being thrown in full force, according to MIC.

Although price is certainly a consideration, the publication warns that buying too cheap a system may lead to problems later. An expandable system is important to a user, according to the report. If a system cannot be expanded, the user may have to switch systems or even manufacturers, resulting in high dollar and time loss.

MIC advises users to select equipment capable of accommodating more and larger tasks but without extensive, time-consuming and costly alterations.

When purchasing a system, the user should look for a microcomputer which can accommodate the amount and type of peripherals needed. According to MIC, if the system can support only a limited amount of peripherals, the user should know it.

The potential buyer should check that the supplies necessary for the system such as disks, paper and ribbon can be purchased locally at a reasonable price.

Another area of concern for the buyer is the manufacturer's support and service. On-site repair, service turnaround time and peripheral service are important considerations when coping with daily workloads, according to the report.

Turnkey systems might be advisable for many first-time users, MIC pointed out, since otherwise, the user will have to learn to operate the system himself or hire someone else to operate it. It is also important to find out if the system is capable of fulfilling the buyer's requirements for the uses he has planned.

The future of the manufacturing firm should be examined when buying a system. Whether the company is going to continue to diversify its product line, whether it may

(Continued on Page 54)

Underwater Inspector Depends On Micro System for Control

SURREY, England — An unmanned underwater inspection vehicle, developed here, dives, navigates and relays picture signals of an ocean or lake's bottom to the surface with the help of a Motorola Semiconductor Products, Inc. 6800 microcomputer system.

Smartie, an underwater inspection vehicle, uses an onboard microcomputer to record underseas data.

Developed by Marine Unit Technology Ltd., the Submarine Automatic Remote Television Inspection Equipment (Smartie) uses the onboard micro system to interpret manually input signals from the surface and control speed and direction.

The system also accepts input from the submersible's manetic compass and gyroscope to project an artificial navigation target the operator can follow on his CRT screen even if Smartie is passing through an area of low or zero visibility. If Smartie is operating in fast currents, the operator can maintain a fixed position in the water by pressing a "hold" button, and the system will automatically compensate for the current to keep the vehicle in position. The "hold" button is also useful for keeping the craft steady at fast speeds.

The system uses a 6802 microprocessor which includes a CPU and 1K byte of erasable programmable read-only memory. Information is communicated on a time-multiplexed system and comes up from Smartie superimposed on the CRT.

Smartie is linked by a single core cable to the surface and the device is driven by an electrically powered water pump. The unit is also equipped with at least one low-light silicon intensified target camera and a high-resolution video camera and can operate to a depth of 1,000 feet.

Smartie is for hire in the U.S. and comes with three skilled operators. Inquiries can be directed to Marine Unit Technology Ltd., 3 Friars Lane, Richmond, Surrey TW9 1NL England.

National Semi Adds Coder/Decoder

SANTA CLARA, Calif. — Described as the first commercially available monolithic single-channel coder/decoder (Codec) that meets both U.S. and CCITT specifications, the TP3000 from National Semiconductor Corp. was designed for digital coding and decoding of analog signals in the voice frequency band.

The CMOS/Bifet Codec is available in two versions: the TP3001 utilizes u-law coding while the TP3002 is an A-law system. The pulse code modulation systems (PCM) sample a filtered analog signal at 8 kHz and then convert the sampled voltage to an 8-bit companded digital code. The code is then loaded into a high-speed serial output buffer operating at 64K- to 2,100k byte/sec.

Each system consists of two circuit packages and features a power-down mode that when the system is not acutally processing signals, drops power consumption to less than 4% of the standard operating level. In addition, the mode does not have to be externally initialized when starting the system up, the firm said.

Each 2-chip system includes a nonlinear D/A converter, voltage reference with long-term stability, an input digital buffer, input and output samples and holds and control logic.

The TP3000 costs approximately $23 in single quantities from National Semiconductor Corp., 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

First Users Warned Not to Look at Price Only

(Continued from Page 53)
be absorbed by a larger company or even whether it may go out of business are all factors to consider to make a sound financial investment, according to the report.

Talk to Users

Before making a final decision, MIC advises a buyer to talk to current users of the system and find out how it is working for them; if they are unhappy with the system or if the manufacturer won't provide user names, that system should no longer be considered.

In addition to hardware considerations, software capabilities should be examined, MIC suggests. A common complaint among users is the lack of good application software for the kind of job they need to have performed.

Since customized software is expensive, and therefore unattractive to many small business users, off-the-shelf or packaged software that has undergone a few alterations is most often used.

Users should know how to go about purchasing applications software, and MIC suggests four primary sources including the manufacturer, the computer store, mail order programming houses and magazines. Since the manufacturer's software is not necessarily the best, MIC suggests looking at one or all of the other sources before buying.

Introduction and Guide

The publication is intended to be a combined introduction and guide for microcomputer users. In addition to advising buyers how to purchase a system, the report also outlines a number of representative real-life systems to demonstrate both the typical system and the variation between typical systems.

The micro systems discussed in the report are limited to those that are available through retail computer and department stores or through the mail. The report does not deal with higher priced systems or those marketed through other channels.

Prime Candidates

Providing an overview of the microcomputer, the publication suggests prime candidates for a small system. Many of the suggested users are small businesses with less than $2 million annual sales which previously used DP service bureaus, purchased a more expensive minicomputer system or adopted a "wait-and-see" attitude.

Simple definitions and explanations of system components and common micro terms are presented in the report. Hardware and software are defined and explained for the understanding of the average user.

Major manufacturers' systems are presented with an indication of what a typical configuration includes, what applications it can perform and how much the system costs. A complete list of manufacturers and their addresses is also included as well as a glossary of terms and information on the major micro magazines.

The report costs $7.50 from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

Rental Company Offers Analyzer

WESTLAKE VILLAGE, Calif. — Microcomputer Rentals has added to its line the Millenium Microsystem Analyzer for development, testing and diagnostic analysis of microprocessor-based products.

The unit is capable of supporting many of the common microprocessor types to provide versatility, the firm said.

The basic monthly rental rate for the unit including an in-circuit emulator is $254. Longer term rental rates are lower and leasing is available from Microcomputer Rentals, 705A Lakefield Road, Westlake Village, Calif. 93161.

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Albert W. Paul
Data Processing Manager
Minolta Corporation
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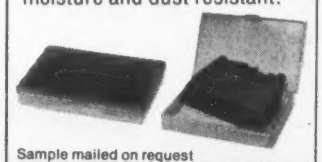

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Recovers From $21 Million Loss

MDS Turnaround Makes Ink Run Black

By Marcia Blumenthal
CW Staff

HERKIMER, N.Y. — Mohawk Data Sciences Corp. (MDS) has been experiencing a financial reversal for the past three years — but it is the kind of reversal that turns red ink to black.

In 1975, MDS lost $21 million, its total debt was $163.8 million and its equity stood at a paltry $13 million. By the end of its last fiscal year in April, the firm posted earnings of $6.2 million, reduced its total debt to $117 million and increased its equity to $40 million.

Obviously relishing the task, Ralph H. O'Brien, MDS chairman and president, recounted the details of the company's capital restructuring at a special press day held here recently. Other executives presented the company's future marketing plans and outlined manufacturing strategies to a group of financial analysts, trade press representatives and industry observers.

O'Brien attributed the company's turnaround to the skills of the firm's top management. Of the 15 top executives at MDS today, 12 have joined the company since March of 1975. All of the newly hired executives are seasoned, viewing themselves as professional managers rather than entrepreneurs, O'Brien stressed.

Moving quickly, O'Brien and his management team streamlined the company's operations, terminating several unprofitable product lines such as plug-for-plug disk replacements and printer products, which were OEM-oriented. In addition, MDS management reduced employment by 40%, closing six domestic and two foreign plants.

Selling off old rental equipment generated needed cash flow. With the funds realized from these sales, O'Brien began to refocus the company's emphasis from the OEM market to the end-user market. He decided to spend $25 millon to launch a distributed data processing (DDP) system; that decision resulted in the Series 21 product line introduced in January 1977.

(Continued on Page 56)

Four Mainframers Report Strong Gains in Third Quarter

Earnings increases for four mainframers during the third quarter ranged from 27.5% to 100% while revenue increases stretched from 15% to 83%.

Amdahl Corp. was the leader in the percentage race, posting a 100% gain in third-quarter earnings as they climbed to $12.8 million or 75 cents a share, up from $6.4 million or 40 cents a share in the year-ago quarter.

Revenues for the period topped $84.9 million, an 83% increase of the $46.4 million revenues reported a year ago.

For the nine-month period, Amdahl's revenues showed a 72% improvement, soaring to $222.6 million from $129.5 million in the corresponding period a year ago. Earnings tallied $33.4 million or $1.95 a share, an 89% increase from 1977's nine-month postings of $17.6 million or $1.10 a share.

All earnings figures were adjusted for the two-for-one stock split in April, the company noted.

In commenting on the company's performance, John C. Lewis, president, said initial shipments of Amdahl's 470V/7 were made before the quarter's end. Shipments from new production facilities in California and Dublin, Ireland, have started.

(Continued on Page 60)

Hawaii Striving to Lure DP Industry

By Ronald A. Frank
CW Staff

HONOLULU — Hawaii provides an ideal setting for computer and other electronics companies to base their research and manufacturing operations, but companies on the mainland are not aware of this, according to Herman Hu, director of engineering at Hawaiian Telephone Co.

At present more than 95% of the electrical engineering graduates from universities in Hawaii have to leave the state to get jobs, Hu remarked, but steps are being taken to reverse this trend.

One of the most ambitious efforts to bring new industry to Hawaii is the formation of the Hawaii Institute of Electronic Research. Established as a nonprofit corporation, the institute will foster research and development designed to create a favorable climate for firms to locate in Hawaii, Hu explained.

Computer communications is a highly promising area; it is basically the type of high-technology, clean industry that the state is trying to attract, Hu noted.

Promise for Industry

Computer development, including the creation of local data base services, holds promise because of the state's orientation toward the leisure industry, Hu said. In addition, the natural distances separating Hawaii from the U.S. mainland act as a spur to research and development in the area of telecommunications.

As one of its first major goals, the institute is determined to create 1,000 jobs in Hawaii in the next five years. Hu believes this goal could well be surpassed once industry becomes aware of the academic research facilities available in Hawaii as well as the labor pool waiting to be tapped.

Despite its image as a playground, Hawaii can offer business a central base from which to open Asian markets. And many corporate executives frustrated with battling severe winter weather would welcome the opportunity to develop their companies in Hawaii, Hu believes.

The institute is being launched by the Hawaii Department of Planning and Economic Development in collaboration with the University of Hawaii and major local industries such as Hawaiian Telephone Co.

Information about the Hawaii Institute of Electronic Research is available from Andrew Gerakas, State of Hawaii Department of Planning and Economic Development, Kamamalu Building, 250 S. King St., Box 2359, Honolulu, Hawaii 96804.

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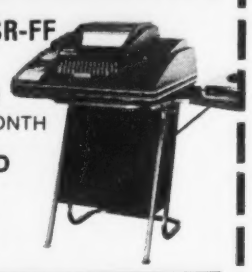
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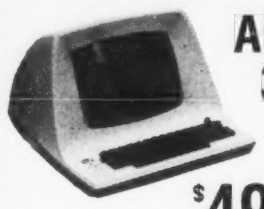
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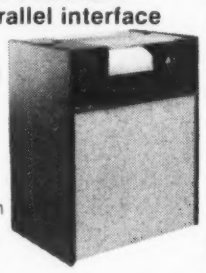
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MDS Gains Turn Red Ink to Black

(Continued from Page 55)

Another cash generator was the company's lease base, which O'Brien still considers one of MDS' strongest assets. Until recently 70% of the firm's revenues were derived from rentals, with the remaining 30% generated from outright sales.

While this strategy is still considered strong, O'Brien noted that a decision was recently made to change that mix slightly. In the future, MDS plans on a 65%-35% rental to sales ratio.

The financial turnaround for MDS occurred in the second quarter of fiscal 1978, O'Brien said. By then, MDS had reduced its interest expense from 10.4% to 4.5% and raised its pretax profit from a negative 10.2% to a positive 8.9%.

Recently a greater emphasis has been placed on marketing and, over the past three years, MDS has increased its marketing and general administrative costs as a percentage of sales from 26.2% to 29.7%.

An industry observer noted that in 1974 MDS had severe weaknesses in its marketing force. The analyst also hinted that the sales force may still constrain MDS because its current products are much more technically refined, calling for a sophisticated sales crew.

MDS will continue to stress data systems in the future, O'Brien said. In 1975, such systems accounted for 43% of MDS' activity; today 75% of its business is derived from sales and rentals of systems.

The systems emphasis along with international marketing capabilities, a broad customer base and streamlined production facilities are, according to O'Brien, the company's other main strengths.

F. William Stamper, vice-president of product planning, said MDS is focusing its marketing efforts on distributed, interactive systems that are host-related. The equipment requirements for this market, Stamper said, "are small intelligent devices to capture data, with limited processing ability but the capability to transfer to the host computer."

Right now, according to Douglas A. Davidson, senior vice-president of marketing, "most DDP users do not require large, clustered terminals at local sites, but rather dispersed, keyboard intelligent devices at many stations. Most configurations need two terminal stations."

MDS' future plans call for product enhancements in three directions: additional functions, including peripherals and communications abilities; additions of high- and low-end systems; and networking abilities which would allow the interconnection of local Series 21 systems. The 21/20 and 21/40 systems will offer a concurrency feature within the next six months, Stamper said.

However, Davidson stressed MDS is not narrowing its product line to only DDP systems. "We have not neglected data entry nor do we intend to. Although we intend to stress the Series 21, we have 400 new customers for our 1200 and 2400 products.

Claiming that the demand for the Series 21 is exceeding the 25% to 35% growth predicted by industry experts for DDP equipment, Davidson said MDS now has 300 sales offices in 13 countries, with more than 2,600 people employed in sales and service.

Although increased marketing capabilities is a high priority with MDS, the vendor has not neglected production efficiencies. The production cycle is now geared to turnout Series 21 products for eight-week delivery, O'Brien noted.

Production Efficiencies

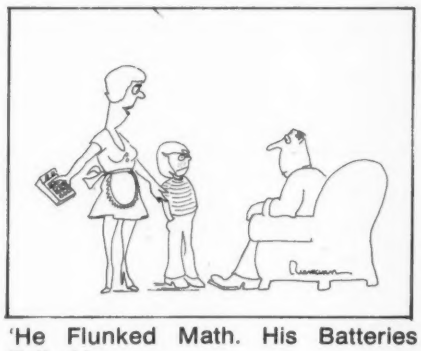
William J. Mann, senior vice-president of operations, attributed the increased plant efficiency in part to MDS' $1 million investment in test equipment. With the new equipment, Mann said, MDS requires fewer technicians and less skilled personnel for assembly.

As a result of the stringent testing capabilities provided by the equipment, Mann said, the Series 21 was introduced with significantly fewer start-up problems than any other product manufactured.

Although MDS seems to be thriving, some industry observers are eyeing excess plant capacity as an indicator either that demand is not growing as fast as MDS executives claim or that the sales force is still a limiting factor.

Furthermore, analysts have pointed out that the Series 21 lacks a transaction processing capability and that its software applications are written in a nonstandard language — Mobol. And, of couse, the effect of IBM's 8100 system is still to be determined.

In the next 18 months, the effects of any weaknesses should begin to surface, one analyst noted. For the moment, however, he was impressed with the financial turnaround MDS has achieved in the past three years.



'He Flunked Math. His Batteries Failed.'

VDP-100 Gets Six Distributors

ANAHEIM, Calif. — Lear Siegler, Inc.'s Data Products Division here has signed six firms to distribute its VDP-1000 small business computer system. It plans to eventually market the system through a worldwide distributor network.

The division expects to have 22 distributors by the end of the year, according to Cathy Raftery, product manager.

Distributors will fall into three categories — software development firms, service bureaus and systems houses. These types of companies are anxious to enter the small business system hardware market, which is expected to grow "from a current $850 million in annual sales to $1.2 billion by the mid-1980s," according to Raftery.

"Particularly in the service bureau industries, companies are concerned they will lose current customers if they do not have a complete system to market," she added.

While the VDP-1000 is designed and manufactured by Lear Siegler's Data Products Division, most companies producing small business systems do not manufacture their own equipment, Raftery said.

"Most of the available equipment," she noted, "is assembled by small start-up companies. Users therefore must be concerned about how long such firms will be around to support and maintain the products."

The VDP-1000 system is priced at $21,000 through distributors. Its applications software — such as for retail pharmacy, oil products distribution, government and general business uses — is priced "from a few hundred dollars to several thousand, depending on its level of sophistication and on the orientation of the distributor," she said.

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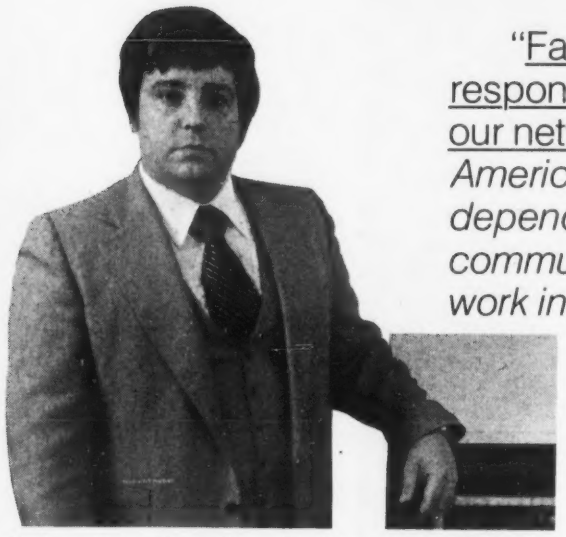

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Canadian DP Trends Predictor Moves to U.S.

FORT LEE, N.J. — Evans Research Corp. (ERC), a Canadian firm that specializes in monitoring and predicting trends within the computer industry, has extended its services to the U.S by opening offices here and in Minneapolis.

The company, a 10-year veteran of computer industry research, plans to provide a series of quarterly updated reports, as well as sponsor a number of DP seminars geared toward the remote computing services (RCS) user, an area which includes everything from remote batch to time-sharing systems.

Info-Dyne, Inc., a local firm interested in RCS applications, will research and write the user-oriented reports and also supply speakers and instructors for each "how-to" session, according to Ron Evans, ERC's president.

The Canadian research company will also publish statistical industry forecasts that will track the corporate motions of the 50 leading RCS vendors through 1985, Evans said.

"We will provide RCS users and suppliers with an in-depth understanding of how to plan for, select and manage a remote computer facility," Evans continued.

Users can benefit from the firm's detailed research reports while suppliers can use the forecasting profiles for "competitive purposes," he added.

The research service is aimed at senior DP managers and executives who need to decide how to choose between RCS, small, decentralized business computers and large-scale mainframes: "As users become more sophisticated and realize they should be using a mix of all three modes of processing . . . we will be there to address their needs."

The firm has already prepared its first user guide and has scheduled a one-day seminar for the upcoming months.

"A Guide to Planning, Selecting and Managing Remote Computer Services" is available at the introductory price of $345, while the course, "How to Plan, Select and Manage Remote Computer Services," will cost $295 and will take place in Stamford, Conn., on Nov. 28 and in New York City on Dec. 5.

ERC's American headquarters is located at 1394 Palisade Ave., Fort Lee, N.J. 07024.

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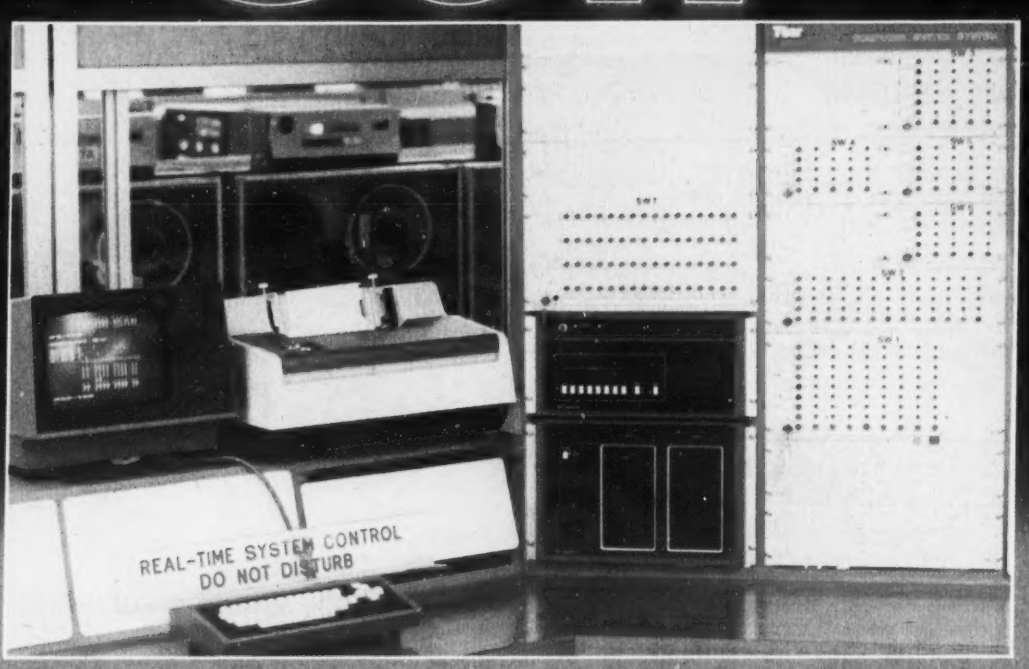

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3M Officer Elected Head Of Cbema

WASHINGTON — Carl A. Kuhrmeyer, vice-president of 3M Co.'s Graphic Systems Group, was elected chairman of the Computer and Business Equipment Manufacturers Association (Cbema). He succeeds Roy L. Phelan, NCR Corp. vice-president of research and development.

Kuhrmeyer heads the 1978-1979 slate of officers elected at the association's annual fall meeting here.

Wallace C. Doud, IBM vice-president of commercial and industry relations, was elected Cbema vice-chairman, Earl P. Behm, 3M Business Products sales manager in the Government Department, was named Cbema Office Equipment Group chairman and Edward Lohse, Burroughs Corp. director of engineering for operations, was elected chairman of the Cbema Data Processing Group.

In their positions, Behm and Lohse will also co-chair the Cbema Plans and Policies Committee, which oversees day-to-day operation of all the association's programs.

Herbert M. Kaplan, director of business planning for Dictaphone Corp. Products & Systems, and Carl Rench, NCR assistant vice-president for research and technical affairs, were elected vice-chairmen for the Cbema Office Equipment Group and Data Processing Group, respectively.

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Decides Against System/4

Decision Data Triples Quarter Net

HORSHAM, Pa. — Decision Data Computer Corp. reported third-quarter earnings of $1.2 million or 30 cents a share compared with earnings of $377,000 or 10 cents a share in the year-ago quarter.

Revenues for the quarter were $14.5 million, up from $8.7 million in last year's third quarter.

Nine-month revenues just topped $32 million compared with 1977 nine-month results of $25.1 million.

Earnings for the nine months were $1.8 million or 44 cents a share compared with $894,000 or 24 cents a share earned in the corresponding period last year.

Equipment Sold

Third-quarter earnings included the gain realized from the $7.7 million sale of the company's U.S. installed base of 96-column card equipment to North American Corp.

The sale of this equipment allowed the firm to prepay $7.2 million of its bank debt, according to Louis H. Benzing, Decision Data's president, resulting in a favorable renegotiation of its bank loan agreement.

The amended agreement provides for a term loan of $12 million and a revolving credit line of $2 million until February 1980. It will result in considerable savings in interest expense, Benzing said.

Decision Data decided to deemphasize its System/4, a small business computer system during the quarter. This decision was based on the company's assessment that the market penetration for the System/4 over the past year was lower than expected.

In addition, the funds required to achieve the desired earnings were considered excessive, particularly in light of other product opportunities, Benzing said.

"The company's withdrawal from the System/4 program will be done in a planned and deliberate way so none of Decision Data's existing customers will be adversely affected by our decision," Benzing stated.

The firm will concentrate on its printer products, he said.

Financial News

Computer Horizons Gains

NEW YORK — Computer Horizons Corp.'s second-quarter earnings climbed 101% and revenues rose 39%.

Earnings totaled $112,678 or 18 cents a share compared with $56,059 or 10 cents a share in the year-ago quarter. Revenues stood at $2.3 million, up from 1977 second-quarter revenues of $1.7 million.

First half earnings rose 140% reaching $254,519 or 43 cents a share. Last year's first half earnings were $106,224 or 19 cents a share. Revenues for the half topped $4.7 million, up 53% from $3.1 million in the 1977 period.

Commenting on the record year-to-date performance, Ronald Finegold, chairman of the board and president, attributed the gain to the continuing growth of the Software Services Division's client base.

New Registrations

NATIONAL SEMICONDUCTOR CORP., 2900 Semiconductor Drive, Santa Clara, Calif. 95051, has filed to register 600,000 shares of common stock. No underwriter is involved.

DATA DIMENSIONS, INC., 51 Weaver St., Greenwich, Conn. 06830, has filed to register 440,000 shares of common stock. Underwriters: D.H. Blair & Co., Inc.

AUTOMATIC DATA PROCESSING, INC., 405 Rt. 3, Clifton, N.J. 07015, has filed to register 500,000 shares of common stock. No underwriter is involved.

MCI COMMUNICATIONS CORP., 1150 Seventeenth St. N.W., Washington, D.C. 20036, has filed to register 1,120,000 shares of cumulative convertible preferred stock and 240,000 shares of common stock. Underwriters: Allen & Co., Inc.

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Four Mainframers Increase Nets

(Continued from Page 55)

Two products, the 470V/5-II and the 470V/8, have been added to the product line [CW, Oct. 23]. The company also reduced the price of memory for the 470V/7 by $25,000 for 1M byte to conform to the memory price for the rest of the product line, the firm said.

Reductions in U.S. prices for its V/5, V/6 and V/7 were also made, amounting to a 7% price reduction for a typical system configuration, the firm noted. However, Amdahl increased its U.S. maintenance charges by about 5%.

NCR Net Up 68%

NCR Corp. showed a 68% increase in earnings for its third quarter. Earnings topped $46.9 million or $1.66 a share compared with the $27.8 million or 99 cents a share earned during the third quarter last year.

Revenues climbed to $638.3 million, a 15% increase from last year's quarter revenues of $554 million. The figures reported do not include gains from the sale of the company's Appleton Papers Division, which was sold to B.A.T. Industries in June, the company said.

To date, 1978 revenues have passed $1.7 billion, a 10% increase from 1977's nine-month revenues of $1.5 billion.

Earnings for the nine-month period totaled $228 million or $7.95 a share compared with the $83.1 million or $2.98 a share earned in the first nine months of 1977. However, these earnings figures include the contribution of the Appleton Papers Division through June 30 and a nonrecurring gain of $110.4 million or $3.78 a share from the sale of the Appleton Division.

Sizable revenue growth in the third quarter that allowed better allocation of cost items was a major factor in the significant increase in earnings, a company spokesman said.

Control Data Corp. increased its earnings 33% from 1977's third quarter. Earnings totaled $24 million or $1.39 a share, up from $18.1 million or $1.06 in the year-ago period.

However, earnings from CDC's computer business surged ahead 85%, reaching $11.3 million compared with the $6.1 million earned last year.

Revenues from the computer portion of the business came to $479.3 million for the quarter, a 28.7% increase over 1977's third-quarter computer revenues of $373.5 million. The quarter revenues were split just about evenly between sales and rentals of computer equipment.

CDC's nine-month revenues from the computer business topped $1.3 million compared with revenues of $1 million for the first nine months of 1977.

Year-to-date earnings from CDC's computer business reached $28 million vs. the $14.6 million earned in the same period last year. Consolidated earnings were $65.2 million or $3.77 a share, up from 1977 nine-month postings of $48.2 million or $2.80 a share.

In noting that the computer sector of CDC's business was responsible for the largest earning gain, CDC Chairman William C. Norris said the rental base of large-scale computers continues to expand in line with the company's strategic goals. OEM business continued to rise, and data services revenues increased 19% during the third quarter.

Honeywell, Inc. posted third-quarter earnings of $45.9 million or $2.15 a share, up 27.5% from 1977 third-quarter results of $35.9 million or $1.70 a share.

Total revenues were $867.1 million compared with 1977 third-quarter revenues of $711.5 million. Revenue from computer rental and service was $178.9 million, up 18.5% from $151 million in the corresponding period a year ago. Computer sales figures were not available from the company.

For the first nine months of 1978, Honeywell's revenues were $2.5 billion compared with $2 billion last year. Nine-month revenues from computer rentals and service totaled $514.9 million vs. $438.7 million for the period a year ago.

Earnings for the nine-month period were $125.2 million or $5.87 a share compared with 1977 nine-month earnings of $96.4 million or $4.58 a share.

"All major segments of Honeywell's business contributed to the company's strong performance," Edson W. Spencer, chairman and chief executive officer, said.

Combined Show Set in Sweden

GOTEBORG, Sweden — A conference combining two past Swedish computer shows — the Mikrodator microprocessor and microcomputer exhibition, and the Scanautomatic exhibition on process control and automation — will be held here on Nov. 28-Dec. 2.

Called Mikrodatorsystem '78, the conference will cover such areas as computer peripherals, complete microcomputer systems, microprocessors and memory circuits, process control and automation, hydraulics and pneumatics and power transmission.

More than 15,000 attendees are expected at the show, which will be held at the Swedish Trade Fair Foundation's Exhibition and Congress Center. Further information is available from the foundation at P.O. Box 5222, S-402 23, Goteborg, Sweden.

Itel Organization Formed in Mexico

MEXICO CITY, Mexico — Itel Corp.'s Computer Products Division has formed a marketing organization here in cooperation with Mexican investors.

Called Itel Mexico S.A., the firm will market Itel's line of IBM plug-compatible systems and peripherals, including its Advanced System processors, according to James P. Gafke, division president.

Victorio Sanchez has been named general manger of Itel Mexico, responsible for all marketing activities. Sanchez was chief of the DP Coordinating Committee for the Mexican Ministry of Finance and earlier held management positions with IBM in Mexico and Europe.

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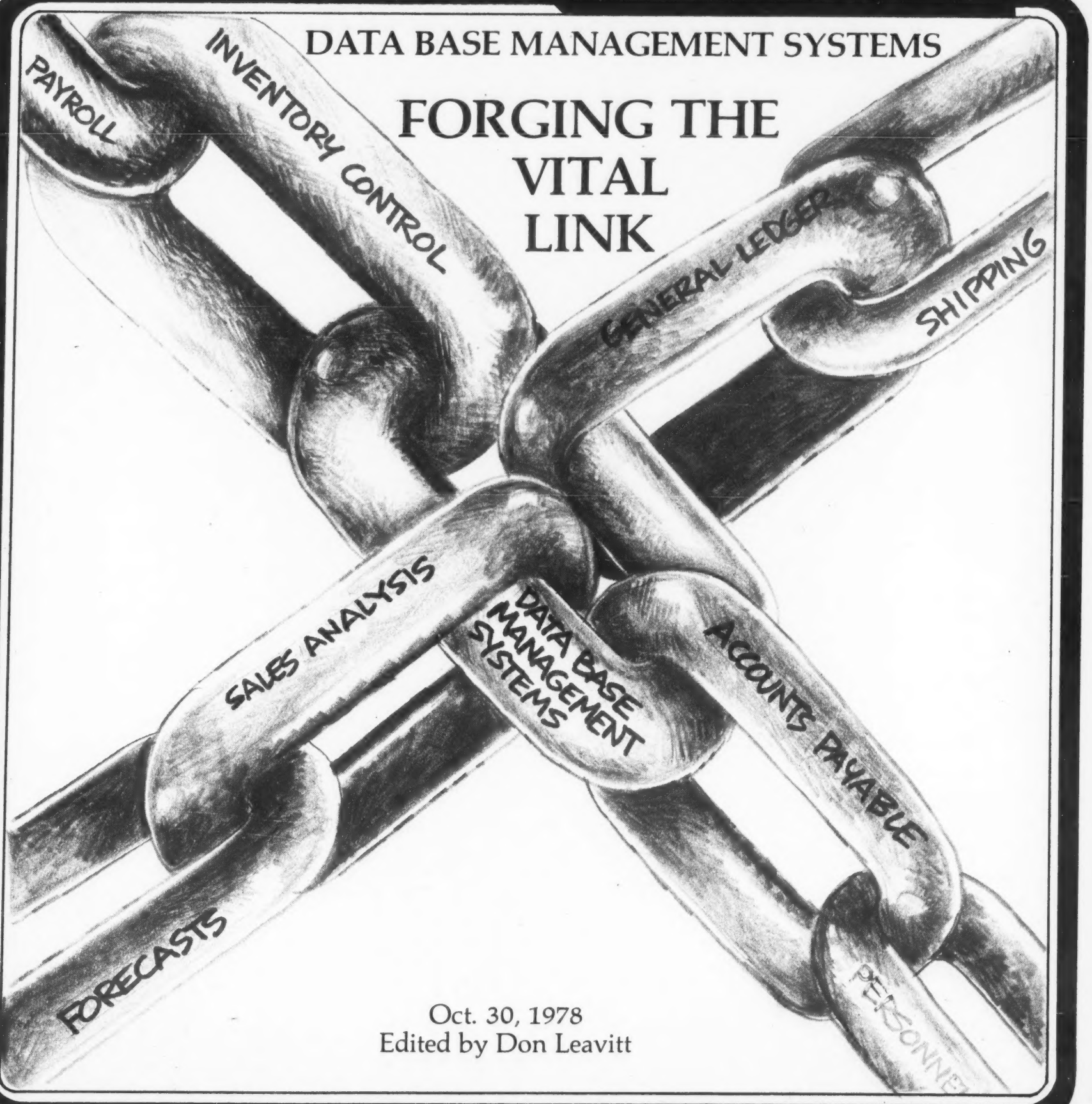
DATA BASE MANAGEMENT SYSTEMS

FORGING THE VITAL LINK



Oct. 30, 1978
Edited by Don Leavitt

Affects Organization's Planning

Data Base Environment Broadens Users' View

By Leo J. Cohen
Special to CW

Halfway through the 1960s it probably would have been possible to coin a term such as "computer-based data processing." The intention of such a term would be to imply that while all organizations process data in order to manage their affairs, only some of those organizations use computers. If we think in terms of "computer-based DP" as meaning a situation in which an organization carries out virtually all of its DP activities via the computer, then we can see some parallel sense to the term "data-based DP."

In data-based DP, an organization carries out its DP activities in the context of a data base system environment. That is to say, the DP activities largely rely on a common data resource, referred to as the data base, and this resource supports virtually all DP activities of interest to the organization.

This article was excerpted from a forthcoming book by the author.

In this sense, data-based DP might be thought of as the long-term objective for an organization getting into the data base approach. This long-term objective is designed to suite the needs of three broad classes of DP users — end users, those in organizational management and those in systems development. All of them not only have a stake in DP, but potentially can reap certain benefits from the data-based DP environment.

The end user of a computing system, whether he approaches it via a keypunch machine, a remote job entry terminal or a fully scoped console, is generally restrained in the activities that he can carry out by the degree of DP support provided. This is not to say that the user cannot think for himself, but rather that there are limits to what he can do.

As an example, consider a retail buyer who receives a weekly report on current sales by outlet location and merchandise class. This report in effect represents a data base with but a single key — namely, outlet location. That is, the buyer can specify a given outlet location, find the corresponding line entry in the report and read off current sales in each of the merchandise classes.

The buyer may sometimes wonder which outlets have current sales in the range of $8,000 to $10,000 for a particular merchandise class, but in order to determine this he would have to scan the entire column of the report for that merchandise class. This is admittedly not a trivial task if the report has any volume, even though the query, in data base terms, is a simple one.

But here is another query that would render the manual task all but impossible: What outlets have lower sales in merchandise class 3 than in class 4, and have class 1 sales greater than $10,000, or class 5 sales less than $1,000? Faced with the manual processing involved, it is very likely the buyer would go immediately to other things.

Consider now a data base system environment which, instead of producing the report on paper, stores it in the data base as part of the data base system. This makes all of the access methods of the data base package available for referencing the report but, more important, all elements of the report can now be considered as

(Continued on Page S/14)

Perfect Data Base Like Holy Grail

By Garfield Collins
Special to CW

In days of old, knights in shining armor rode off in pursuit of the Holy Grail — the supreme object of Christian relic hunters. Needless to say, they never found it. Perhaps because, as the legend has it, only a knight of extreme purity would ever succeed.

In the modern DP industry, data base has shown a marked tendency to become the new Holy Grail. Those who pursue it often have the same purity of approach as the bold knights were required to have and are equally as unsuccessful.

They pursue a set of supposedly desirable, general objectives without regard to specific needs. This is what we call the "Holy Grail syndrome".

Let us examine the symptoms of the disease and then outline a cure.

What then are these seemingly desirable general objectives pursued by those afflicted with the syndrome?

- Flexibility with changing company requirements.
- Immediate access to the data from many different views.
- No redundancy.
- Program/data independence.
- Accuracy.
- Lower development costs.

The trouble with these as Data Base justifications is that each can be presented equally as disadvantageous. Let's try it both ways.

With data base management systems (DBMS) there can be great logical flexibility of structure and data content.

For example, with a set of product records already in existence, it is easy to add a record type called "Product Type" for a new reporting requirement. The programs that only needed to see "Product" will not need to be changed in any way.

However, if the same company wants to change its distribution philosophy and deliver to customers from a customer-specific depot, instead of from any depot, we are in trouble. The access paths built into the programs must now be changed.

Program logic used to say, in effect, "Access depot stock records for the given product and allocate stock from the nearest depot which enables delivery. Otherwise, generate an order item."

It now needs to say "Access depot stock records for the specific depot which deals with this customer and allocate stock if full delivery" and so forth. The access profile, which is embedded in program logic, has changed.

With several applications accessing a data base from different logical views, the actual organization on disk is a compromise.

When a new requirement comes along, although easy to implement logically, it may not be physically possible to implement within reasonable time without reorganizing the physical structure. But *then* we might worsen

(Continued on Page S/8)

Should Assume Primary Role

Auditors Must Act in DBMS Decisions

By Alan J. Graubard
Special to CW

An entirely new vocabulary has been created and added to the existing collage of acronyms, buzzwords and programming/operational terminology as a result of data base management systems (DBMS).

With this in mind, the adaptation of the DP auditor to the DBMS environment is a colossal task. Unlike DP departments, most audit departments do not have data base experts assigned to their areas. It is therefore the responsibility of the auditor to learn and try to understand the generalities of the various DBMS and then relate this generalized knowledge to the particular DBMS with which he will work.

Given time, the DP auditor would be able to grasp the concepts, learn the internals and understand the techniques involved. Unfortunately, time is not a luxury he can afford.

In many organizations, the auditor is not even involved in the selection process; he is merely told, "We will be using the XYZ data base system." In other cases, the courtesy of being told is not even given, and the auditor becomes aware of a DBMS' in-house use only when trying to access a particular system.

To offset these negative points, the auditor must assume a primary role in DBMS selection and implementation.

Coordinated Effort

The selection process of a DBMS should be a coordinated effort and must include a member of the DP audit department. The criteria established by DP should be reviewed and commented on independently by the auditor.

In addition, efficiency, data security, costs, service, vendor credentials, reliability, backup, implementation, access methods, storage facilities and future growth potential are areas with which

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On the Inside

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BLS Takes Modular Approach to Data Base

By Steve Roman
Special to CW

The Bureau of Labor Statistics (BLS) developed a time-series-oriented information system in the early 1960s. It was a tape sequential system that consisted of a number of subfiles, each of which was stored on one or more reels of tape. The retrieval language that was used provided for extraction, manipulation and tabling of the data.

All in all, it was a reasonably sophisticated second-generation computer system. It did, however, have some drawbacks, among which were overnight runs, a limited responsiveness to user requests and slow turnaround time. In addition, files were not always as current as necessary.

In the early 1970s, a major redesign program was undertaken by BLS to move from the second- to third-generation computers. One of the major objectives of the redesign program was to integrate the requirement for a centralized data base with the production requirements for all of the major BLS surveys. It was hoped that this process would result in a set of readily accessible data bases that could in turn be viewed as one large integrated data base.

Key elements of the plan included a commitment to the data base approach, using the commercially available Total data base management system (DBMS) from Cincom Systems, Inc. and a standard format for time series data.

Labstat, an acronym for Labor Statistics, represents a set of computer programs and a direct access base working in harmony to provide a wide variety of functional capabilities (See Figure 1). The data base approach via the use of Total allows Labstat to be open-ended with respect to the addition of other capabilities and developed in a modular design concept built around an expandable data base with direct addressability.

The Labstat data base resides entirely on direct-access devices, under the control of Total, on an IBM 370/168 MVS system. More than 100,000 time series consisting of roughly 12 million celis reside within 200 million bytes of direct-access storage. Table 1 lists the surveys that currently contribute to the system. From a design point of view, there is no practical limit to the number of series that can be stored.

'Total' Management

As mentioned previously, the Labstat data base is managed by Total. A master or direct access record exists for each series. Linked to the master are record chains of varying length with a set of observations for each year of data associated with the series. This network structure permits direct access on an equal basis to each of the 100,000 series.

The Labstat maintenance module (Figure 2) is a series of subroutines that are called by a drive program to do format conversions and format checking to be sure that the correct files are being entered into the system. The program was designed to allow for the introduction of new data in a simple and straightforward manner.

Since the data is a byproduct of the estimation and/or the tabulation subsystems of the production process, no further editing is required.

User access to the Labstat data base is through four main user-oriented processing systems. Each of the systems, with the exception of the bureau's Table Producing Language (TPL), enters the Total DBMS through a control program that functions as the translation and calling mechanism for each user program. Certain security functions are also performed in the program.

The common interface program assures that data will be retrieved efficiently and correctly. It also means that any modifications to the data base will be transparent to the user programs. Figure 2 depicts the flow of information through the Labstat data base.

Four Major Subsystems

There are four major subsystems within the Labstat data base. A brief discussion of each follows:

- Macro Data Language (MDL) was originally developed by the Federal Reserve Board. The adaptation of the software to our existing data base system was amazingly easy. All data handling is done by a functionally independent routine which was partially rewritten by BLS to access Total files. MDL was designed specifically to handle time-series data and, as such, provides simple but powerful commands for manipulation, displaying and using arithmetic operations.
- The Time Series Processor (TSP), developed at MIT, also provides interactive capability. The system was interfaced with the Labstat data base through the same data handling routine used with MDL.
- The Tailored Retrieval and Information Management System (Trim) was developed to meet the need for utility programs that would load, unload, maintain and list data in the Total system. Trim has become a key element in the procedure to link the Labstat data base with a wide array of user-oriented systems. (Trim was developed before Cincom developed its

(Continued on Page S/4)

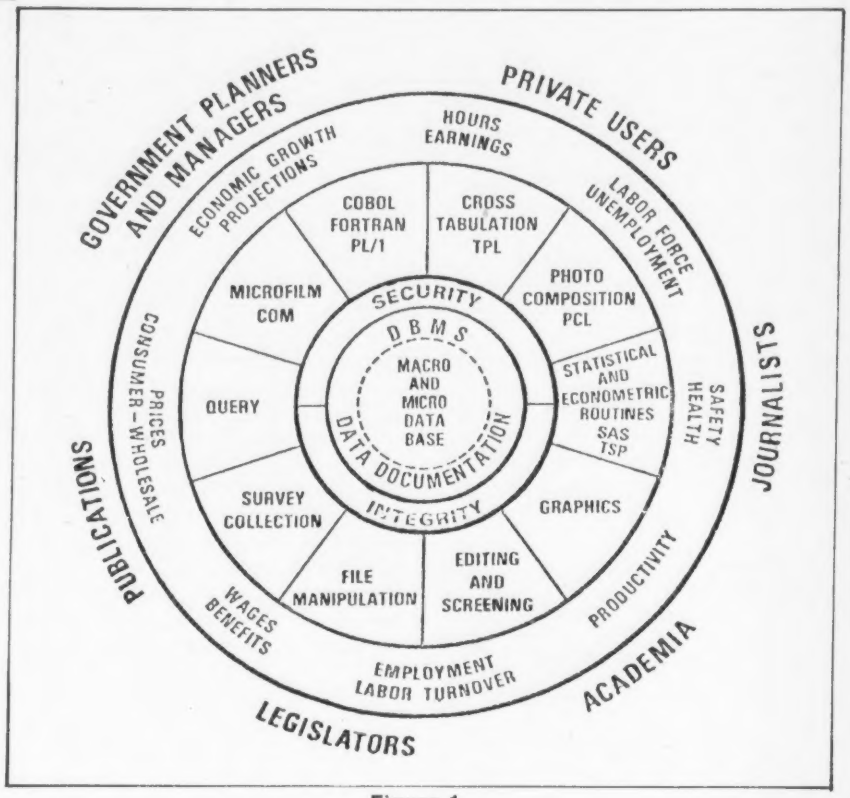

Figure 1

PRINCIPLE TIME SERIES FILES

TITLE	COUNT
Labor force	30,000
Nationwide data on industry employment, hours and earnings	2,850
State and area industry employment, hours, and earnings	20,000
Industry labor turnover	1,250
Consumer Price Index	2,100
Wholesale Price Index	4,100
Industry-sector price index	900
Industry employment and wages covered by unemployment insurance laws	16,300
Unemployment and labor force —	
State and Area	24,200
Imports	700
Miscellaneous	2,200

Table 1

See Us at DECUS Nov. 27-30

DECsystem-10 Users

DPL

DECsystem-20 Users

data processing language

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- RELATIONAL TECHNOLOGY
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Data Base Design Based on Modular Approach

(Continued from Page S/3)
data base administration tools to accomplish the same functions).

• The bureau's Table Producing Language (TPL) has been modified so that it can directly access Total including the special format in Labstat. This interface gives Labstat the capability of producing quality tables for the data in the system. Detailed information on the current version of the TPL, a powerful user-oriented system, may be obtained from BLS.

As previously mentioned, Labstat was developed in the context of an overall plan for the redesign of all of BLS's major systems. The success of the planning effort is indicated by the fact that all of the capabilities as well as an initial data base in excess of 60,000 series, was put in place within seven months by a staff of four analyst/programmers. The addition of series from other sources has turned out to be a relatively easy task, as has been the training of more than 300 people in the use of the system.

The BLS experience shows that long-range goal setting and planning is possible and can pay off. BLS also demonstrated that a modular or functional approach can provide significant advantages with respect to the use of software produced elsewhere.

In addition, it showed that the application of commercially available software significantly enhances the productivity of the development process, not only because of the time saved in not writing some programs, but also because previously used software is relatively error-free.

Finally, the most significant overall accomplishment was the integration of virtually all BLS time series into one on-line data base.

Roman is director of information systems at the Bureau of Labor Statistics in Washington, D.C.

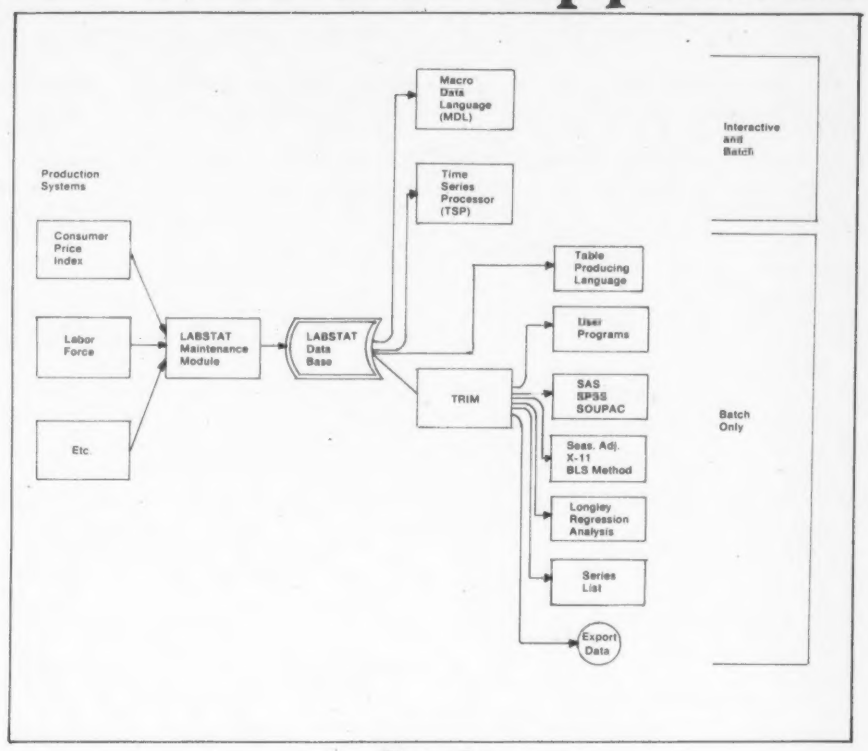

Figure 2

The most exciting DB/DC news isn't in this section

See Page 3 (MAIN SECTION)

Auditors Must Participate in Decisions

(Continued from Page S/2)
the auditor must be concerned.

It is the function of the auditor to investigate the DBMS' potential areas of use in the organization and relate that use to the overall audit plan.

Since independence is of primary concern to the auditor, the methods by which the DBMS will be accessed for audit use must be considered. If an audit software package is in use, the auditor must face certain questions:

• Does it have the ability to interface to the various DBMS being considered or will it be necessary to look for another package?

• Will the auditor have to compromise independence and integrity by being dependent on DP in order to access the DBMS?

• What impact will a DBMS have on existing audits?

• How will the DBMS affect the interaction between the external auditors and the internal audit department?

• What additional costs will have to be incurred in regard to education, program rewrites and additional personnel needs?

Implementation and Use

Once the DBMS has been selected, the auditor has a key role in regard to the organization as well as the audit department.

First, the auditor should be included as part of the team the company puts together to coordinate the conversion. Tight controls must be maintained on all systems and usage of the DBMS security aspects must be reviewed. Any security/control methods currently in use should be carried over, if possible, to the new system.

Also, the auditor should apply the conversion schedule the company will be following to his planned schedule of audits. For example, if the accounts receivable system is going to be the first major system converted to the data base, then all audit plans regarding that system should be changed to adapt to the file and access structures.

Such things as confirmation programs, footing procedures and control listings will have to be altered to accommodate the data structures and additional changes.

The auditor should also include scheduled reports to the organization's audit committee and timely status reports of the conversions' progress.

Graubard is product manager for the Audit Analyzer system at Program Products, Inc., Montvale, N.J.

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At Mobil, RCA

In-House User Groups Discuss IDMS Use

Special to CW

NEW YORK — Mobil Oil Corp.'s International Division and RCA Corp. — users of the Integrated Data Management System (IDMS) from Cullinane Corp. — recently instituted corporate-wide users groups to share working-level experience with data base technology and increase their effectiveness in implementing the IBM-oriented software.

The users group concept has long been used by vendors in supporting their customer installations. While RCA and Mobil both started with the idea, they've taken alternate approaches in implementing it to meet their different corporate needs.

Attendees at RCA's user meetings come from the 12 operating units within the conglomerate that utilizes the IDMS software. The data base system is situated on two IBM 370/168s at RCA's computer center in Cherry Hill, N.J.

The group is informally managed by the users themselves. "People will attend the meetings, get out of them what they want and then not come back for a while," Anthony Somma, manager of accounting projects for the corporate Business Systems & Analysis group, explained.

"The group includes very experienced, new and potential users of IDMS," Somma continued. "And we feel a loose structure best suits its varied needs."

Mobil's User Group

Mobil's user group, in contrast to RCA's, is under the direction of the corporation's computer consulting department. It is a formally constituted committee with attendance limited to less than 20 people.

The company's four European marketing affiliates, which have major computer installations, make up this group. They are either new or potential IDMS users sharing common applications needs.

According to Phillip Allen, senior management sciences consultant and spokesman for the group, "Our main concern is really in developing standards and procedures for the use of the Cullinane software.

"The IDMS systems will have a significant impact on the affiliates' DP operations," he added. "We want to have guidelines for the affiliates to smooth their transition to data base systems technology."

The ideas for RCA's group originated with Somma when he attended a Cullinane-sponsored users conference in Virginia during March 1978. While there, he recognized a systems programmer from RCA's Telecommunications and Computer Services (Tacs) group. Tacs people run RCA's computer center. They also purchase and maintain hardware and software for the center's users.

Back at corporate headquarters in New York, Somma and his supervisor, Clark Williamson, manager of corporate accounting projects, made arrangements to bring together users for a first meeting on June 13.

"The idea is really perpetuating itself," Somma said. "We had 21 representatives at the June meeting from our operating units which include the Government Business Division, Banquet Foods and the David Sarnoff Research Center in Princeton. There were 38 people at the second meeting and now I'm running out of conference rooms to put all of them in."

Somma described IDMS users' experiences before the group was initiated. "A programmer in one of our units took extension courses to help him implement his application," he noted.

"Another guy just picked up the manual and worked it out that way. Now, with the group, our people don't have to develop applications on their own, using valuable time in the process."

The manager went on to describe meeting topics. "We discuss current and future applications and new software releases. We use the forum to give feedback to Tacs on its users' needs.

"If we see an area where there's a lot of interest, we'll try to form a special interest group," Somma continued. "Presently, one group is concentrating on interfacing IBM's CICS teleprocessing monitor to the system."

Concept Implementation

"The European Data Base Review Committee," Mobil's name for its group, concentrates on new developments and past experiences. The group's two current IDMS users are still new to technology and, therefore, do not have a wealth of information from which to draw.

"We schedule our committee meetings to coincide with our corporate review of data base designs developed at an affiliate," Allen explained. "We want the affiliates to participate with Mobil's Management Sciences Department in evaluating the design. It exposes them to data base concepts they can use and gives the designer added confidence when he goes to implement it.

Mobil's users group originated as a project recommendation of an initial

(Continued on Page S/16)

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College Builds On-Line Information System

By Donald P. Gholson
Special to CW

The application described in this article was developed and implemented by the author at Walters State Community College, Morristown, Tenn., where he served as computer services director for five years. The college has an enrollment of approximately 3,000 students.

MORRISTOWN, Tenn. — In March 1976, Walters State Community College installed a Hewlett-Packard Co. HP 3000. In addition to a wide range of languages, the college also purchased HP's data base management system (DBMS), Image, and inquiry language, Query.

Image is a fully reentrant DBMS that interfaces on the CALL level with applications programs written in Cobol, Fortran, Basic and SPL (an Algol-like assembler language). It uses a partially inverted file structure and can handle up to 99 data sets on an integrated basis within a two-level organization using both tree and plex structures.

Through applications programs, more than one data base can be accessed concurrently. Both Query and applications programs allow concurrent access by multiple users and concurrent access to multiple data sets by one or more users. Read and write access can be controlled down to the item (field) level, as well as at the data set and data base levels.

With this powerful tool at their fingertips (literally, since the majority of the work was done through terminals), the staff began defining the student information system through the medium of the data base's schema. The schema of the data base is analogous to the source program coding of an object-code program. The schema is "compiled" by the schema processor to create a root file for the data base. A second utility program uses the root file to create the empty data base on disk. Once the data base is created, it can be loaded through Query or by applications programs.

The student data base was designed with several factors in mind from experience gained using a batch system:

- There should be one, and only one, source for students' master records, which would serve as the head of chains to each student's individual records.
- There should be a minimum of redundant data stored in the data base (none if possible).
- Because of the requirements for an on-line system, access must be as rapid as possible.
- There should be a single source for all "constant" course data, thus necessitating input of only variable data each term to identify class sections.
- The data base must have the capacity to maintain the schedule of classes of several terms to allow registration for a year's classes at one time, should the administration so desire.
- The data base must have the capacity to maintain permanent records for 25,000 students, including keeping their transcripts on-line at all times.

Using these guidelines, a data base was developed with the data sets and capacities shown in Table 1. The data base used approximately 24M bytes of disk space on the system, which had a disk capacity of approximately 150M bytes on-line.

Data Set Name		Capacity (entries)
SISMAST	Student Master File	25,013
CRSE-CAT	College Course Catalog	1,499
CRSE-MST	College Master Schedule	2,777
ST-HIST	Student Transcripts	250,000
ST-ANNOT	Annotations to Student Transcripts	50,000
ACT-QTR	Current Student Schedules	54,000
FINE-DTL	College "Stop" List	2,500
FEE-DTL	Itemized Student Fees	14,107
FNAIDMST	Financial Aid Master File	73
ANN-MAST	Master File of Annotation Codes	53
PHYSFAC	Physical Facilities Master	497
CAMP-MAS	Campus Code Master File	53
BLDG-MAS	Campus Buildings Master File	17
FINE-MAS	Master File of Fine Codes and Amounts	53
HEGISMAS	Master File of Majors with HEGIS Codes	53
DEG-MAST	Master File of Degrees and Their Codes	53
TCH-MAST	Teacher Master File	401
TCH-HIST	Detail File of Courses Taught by Each Instructor	4,000
DEG-REQ	Requirements for Each College Degree	3,467
FNAIDDTL	Financial Aid Detail Data Set	2,000
GRADS	Graduates of College and Their Degrees	12,000
AUTO-DEC	College Parking Decals	5,000
GRADE-MST	Grade/Course Evaluation Details	15,000

Table 1. Student Information System Data Base

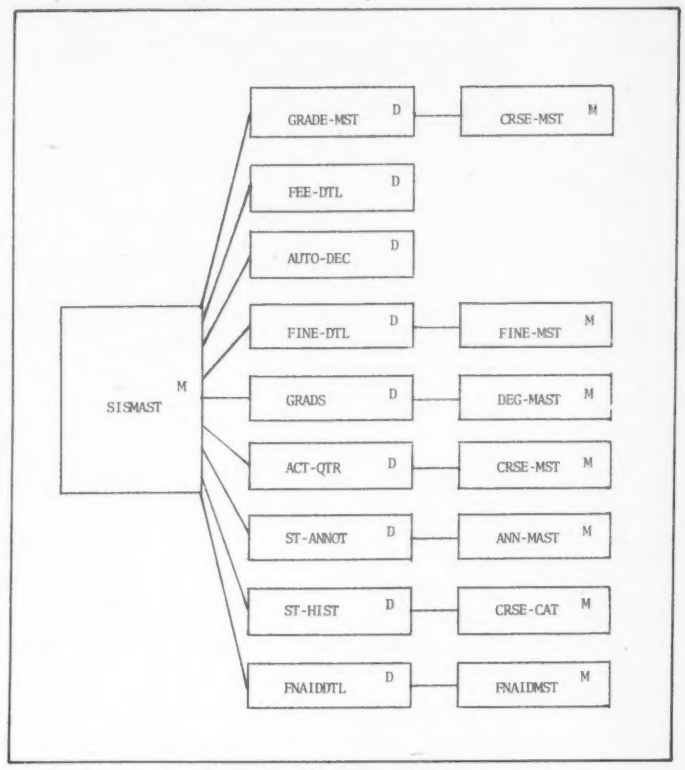

Figure 1. Chaining Pattern

One-Month Conversion

The staff was able to transfer data from various batch-oriented files to the data base and convert the majority of the applications programs to access data in the data base within a month's time. This gave the college the ability to place terminals in the admissions and records office and have them do their own daily processing of applications and updates to student records. This removed a major task from the staff of the computer center, eliminating a duplication of effort, and placed the burden for the integrity of the data on the office that entered and used the data.

In mid-summer of 1976, Steve Jamison of HP's High Point, N.C., office developed an on-line registration program using Image for demonstration at a community college in Virginia. The first pass at a student information system had just been completed when Steve was contacted. He sent a tape of his complete account with the programs and a sample data base.

His program was adapted to the college's data base, and by late August it was running to the point where it could be shown to the admissions office staff. Based on their suggestions and requirements, the program was modified, and it was ready for use during open registration in early September.

Poor Results

The results - DISASTER! The terminal operators got bogged down right at the beginning with a big rush of students and couldn't recover. Thanks to the quick thinking of the director of admissions and the business manager, the old manual system was used to save the day.

In spite of the difficulties encountered, the staff was determined to make the system work before early registration for the next term, in mid-November. HP was kind enough to have Steve Jamison come in for a day and discuss what had happened.

Basically, we had tried to accomplish too much in one program. Registration fee payment, adds/drops, student inquiry and class rolls were all in one large program. When it ran on five terminals, the system just slowed down.

The solution was to break the program into modules and then use only those needed at the appropriate times. In this way, during registration there were two terminals for loading new students' applications (with an open-door policy new students can apply and register at the same time), one terminal for displaying current closed classes, three terminals for registering students and four terminals for paying fees. With this arrangement, a student could usually register at a terminal in less than a minute and spend less than 40 minutes on campus registering and paying fees.

All of the programs in the student information system were written in Cobol. With the exception of the "granddaddy" program which was obtained from HP and later divided into six separate programs, all of the programs were developed by the college's staff.

In order to resolve the problem of incorrect student numbers or incorrectly spelled names which had occurred in

(Continued on Page S/26)

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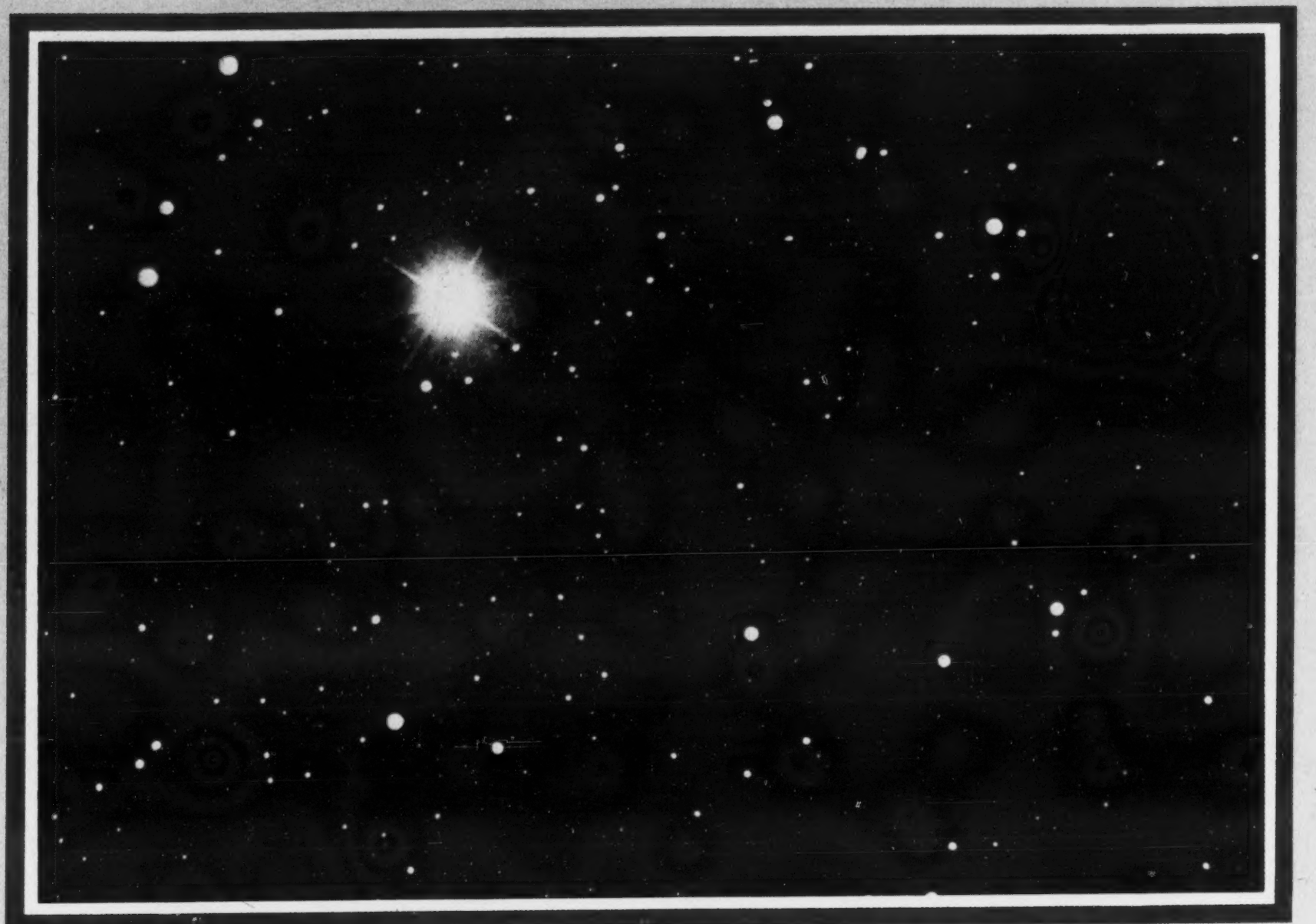

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Data Base Idealists Searching for Holy Grail

(Continued from Page S/2)

the performance of existing systems.

So, should flexibility be a desired goal?

Access from many views is worthwhile, but it is expensive to maintain the necessary linkages. This could be less efficient than successful sorting of data.

Data items are held only once; hence, they are potentially up-to-date, consistent for each use and space is saved.

The cost of maintaining the necessary linkages can be high, though, and in practice, this "advantage" is often at least partially lost because the designers find duplication is necessary to obtain a modicum of physical efficiency.

Accuracy as Neurosis

With data items only held once, more validation can be done on first entry and the use of the data is time-consistent. Unfortunately, the more you achieve this desirable position, the more checking you feel obliged to do to ensure that no accidental corruption has occurred.

As a result, some installations — perhaps rather neurotically — spend as much processing time preparing for, checking for or recovering from integrity faults, than in application processing.

Also, what about human nature? Does the man who maintains this single occurrence of the data actually use it and suffer if it's wrong?

With regard to development costs, programs are much simpler and quicker to specify since the program suite logic is less complex, and increasingly, the data is already defined for the application. In practice, however, the front-end costs can be so high that the effect of these eventual benefits is not very significant.

In addition, access to data can be almost immediate. Any association of data — for which links have previously been established — can be retrieved within seconds. This is fine, if you need it that quickly. But to do it, you need all the data accessible on disk files, all the time.

The Cure

For each of the advantages of these data base goals, there were corresponding disadvantages. Which apply to your installation?

Obviously, the general objectives are not universal truths, merely considerations that depend on what systems are required — now and in the future — for your company.

If you know what you want to achieve in systems terms, you can assess the benefits of data base. The important corollary is that data base techniques will never guarantee your flexibility against completely unknown changes.

A three- to five-year application plan is an essential prerequisite. A strategic study must be carried out across all the application areas in which data base is potentially beneficial.

In the strategic study, an analysis of the overall data requirements is made and trial designs are carried out for a number of DBMS approaches, using the most important functional requirements and a particular data base package as a model.

The outcome is a cost-justified decision on whether data base is to be used and the extent and manner of its use.

For example, it may be decided that the indexes which give the different views of the data are accessed via a DBMS for inquiry and reporting purposes. Operational systems could use logical pointers to files accessed randomly by conventional means.

Following this strategic study, the precise requirements for DBMS software should be known and a formal package selection can be carried out, if required.

Careful Planning

Subsequent development proceeds within the constraint of the overall approach and data structure. This structure is, of course, reviewed if conditions change, but only altered after consideration of its effect on all systems — both existing and future ones.

Let us return to the analogy of the knights, for it appears an effort to attain purity and thus discover the Holy Grail is not enough. The way is beset by pitfalls, unscrupulous plunderers of the unwary, unimagined, steep mountain paths, deep bogs into which the traveler sinks yet deeper as he attempts to extract himself and there is the need for huge supporting armies.

Is it not better to plan the route — and the required logistics — before setting out on the quest?

Collins is consultancy director at BIS Applied Systems, Ltd. in London. His company has carried out data base investigations and projects in 50 organizations in commerce, finance and government installations. He is joint author with E.D.B. Tebbs of Real Time Systems: Management and Design, *published in 1977 by McGraw-Hill.*

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All Have Limitations

DBMS Value Lies in Use — Not Claims, Theory

By William F. Zachmann
Special to CW

Data base management systems (DBMS) are currently the "in thing" in the world of DP. Only distributed processing and structured programming rival the DBMS in evoking articles, buzzwords, seminars, reports and a tireless proliferation of self-appointed experts, consultants and other pontificators.

Suddenly everyone who has had a Rolodex address file on his or her desk and a computer somewhere in the neighborhood has become a specialist in computerized DBMS.

Some very useful things can be done with currently available DBMS. However, some of the things being said about them can make it rather difficult for the prospective user to obtain maximum practical value from a DBMS.

Some rather simple observations about these systems may help put things in perspective.

In particular, three aspects of the current literature on DBMS make the user's job of obtaining practical value more difficult than it need be:

- The tendency to present DBMS implementation in terms of a "total information system."
- Claims which give the impression that a DBMS does things which, in fact, it does not do.
- Confusion, often engendered by academics, between what a DBMS does in theory and what it can do in practice.

Real Value Overlooked

Every new technology or method with promise tends to go through a period in which it is oversold. In each case, a tool that may be very useful for certain things is touted by its enthusiasts as some sort of "everything machine" that will remove all difficulties. As a result, expectations are aroused which cannot be realistically met. In the disappointment that inevitably follows, the real value of a tool can be overlooked.

Linking DBMS with some notion of a "total information system" very often leads to high expectations.

The best of the DBMS currently available provide a means of maintaining data which can, rightly used, be far superior to older methods. But to link their use to the notion of one monstrous data base which keeps everything from sales information to the chairman of the board's preferred brand of after shave, can prevent organizations from realizing much practical value from the systems.

The "total information system" may be workable in some instances. More frequently, it prevents doing smaller, more useful things, by keeping a systems development staff and users occupied solving problems they never had until the project began. Worse still, the problems they had prior to beginning the project can be made more difficult to solve.

Much of the reason for this, I believe, derives from the second point above. Let's take just one very important example: data independence. Proponents of DBMS (including vendors) will regularly claim that the systems in general, or their own in particular, provide "complete data independence."

This and similar claims make it seem to a prospective user that he need not worry at all about how the data is maintained by the DBMS — a reasonable inference from the claims made. In fact, however, no DBMS now avail-

(Continued on Page S/22)

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Should Anticipate Problems

Planning Minimizes Chance of DBMS Failure

By Norbert J. Kubilus
Special to CW

The high cost of gathering, organizing and maintaining data is a growing data processing problem. Most businesses today require data processing to generate their corporate profits, and data bases are regarded as key corporate assets.

Management has increasingly looked to a data base management system (DBMS) to improve its return on the investment in this data. Moving corporate data processing to a DBMS environment, however, is more easily said than done.

Many DBMS installations result in anxiety and frustration. Management becomes skeptical of the DP organization, and end users distrust anyone connected with the DBMS. Analysts and programmers get caught in the squeeze and wonder why neither group appreciates the "good" being done for them.

The failure of any major DP project would elicit similar reactions, but few DP projects are preceded by the promises and optimism of a DBMS installation.

At talks before university and professional groups, I am constantly asked to explain why these installations fail. Smooth conversion of a business to a DBMS cannot be guaranteed, but the chances of failure can be minimized considerably by careful planning, including an open analysis of the potential problems faced in going to a DBMS.

These problems will usually fall into three categories: personnel involvement, applications conversion and cost analysis.

Personnel Involvement

No single individual or department in a company has all the expertise necessary to develop a viable plan for a DBMS installation. Although most of the basic data base management concepts were developed in the 1960s, most of the major systems available today have been developed and marketed within the last six years. In-house expertise in data base management may therefore be minimal within the management, DP and end-user departments.

As many organizations have sadly discovered, attendance at a three-day data base seminar cannot substitute for hard experience with a DBMS. If this experience does not exist in the company, then it should be obtained from the outside — either through new personnel or from a professional service.

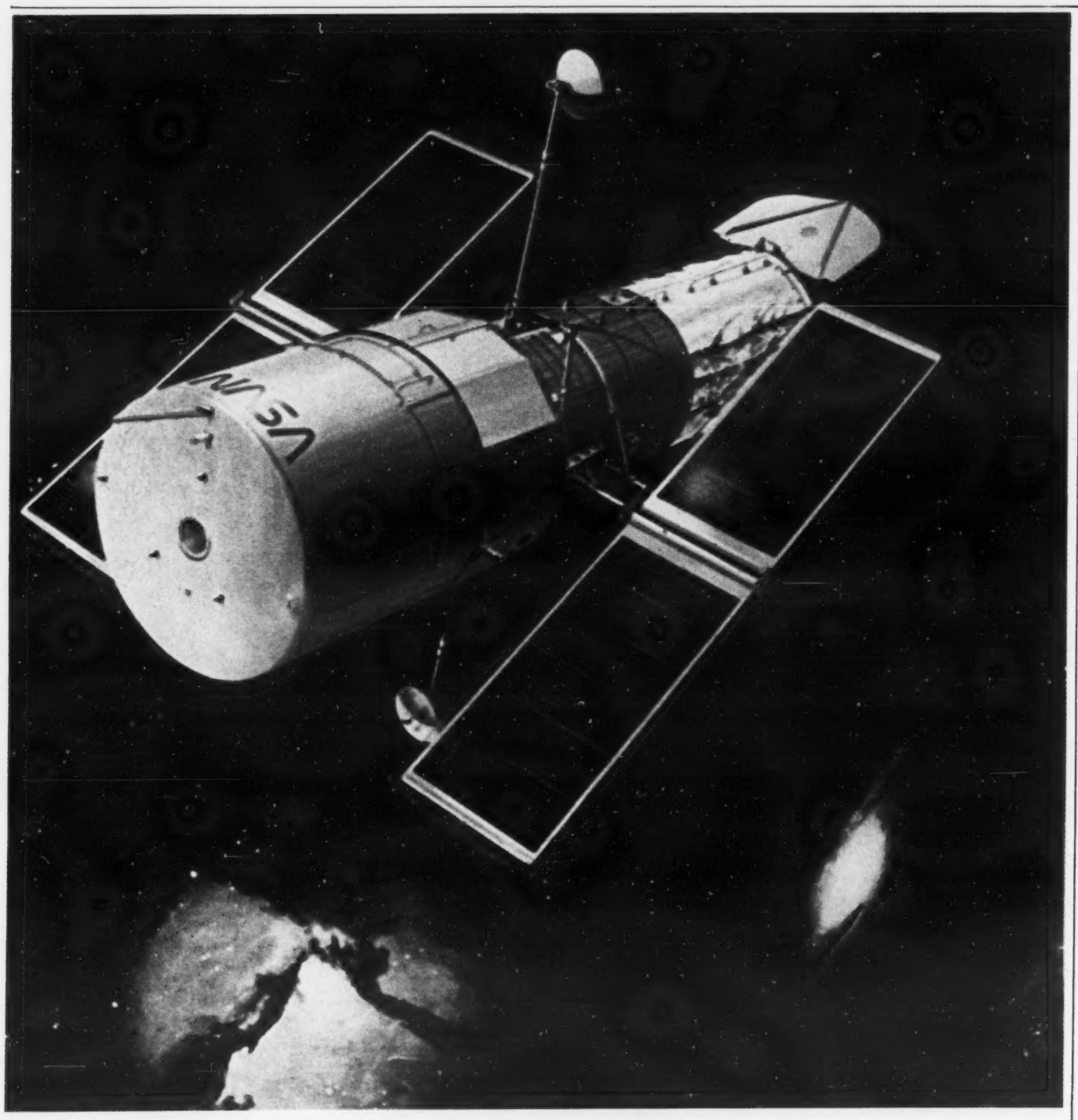
The importance of including management and internal users on the planning group cannot be overemphasized. Both of these user communities have objectives and requirements that must be satisfied by the DBMS.

Nothing can contribute more to a DBMS installation failure than the lack of communication between the DP organization and the rest of the company. As the plan formalizes, the formal education of the affected departments in the company should begin. This keeps everyone up-to-date with the plan and sets the expectation level of users for the DBMS.

Converting a company's DP to a DBMS environment is a large, complex and significant undertaking. A project organization should be set up to manage the conversion effort. This organization's responsibility, authority and accountability will cross departmental lines, as will the impact of the DBMS installation.

A project manager and a second-in-command should be named, and they should

(Continued on Page S/17)



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Model 204

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SEED ON
DEC 10/20
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System Helps Drug Producer Teach Salesmen

Special to CW

To help ensure that its field sales force has the training and technical competence required for selling ethical pharmaceutical products, the Career Development Department of Roche Laboratories is using a versatile General Electric Corp. (GE) data management system that is accessed via GE's worldwide computing services network.

Roche Laboratories is a division of Hoffman-LaRoche, Inc., affiliate of the Roche worldwide group and one of the world's largest ethical drug producers. From its U.S. headquarters in Nutley, N.J., the division manufactures Valium and a host of other health care products.

Before Roche sales representatives can make their first sales call, they must complete an intensive training program on the products they will be promoting. Following this extensive training, Roche salespeople must pass an annual qualification test to verify their continuing technical competence.

The Career Development Department has total responsibility for training and testing the entire field sales force, which consists of 700 salespeople and 65 division sales managers. Here, according to Stanley Kleiner, director of career development for Roche Laboratories, is where GE's DMS II data management system and the Mark III network make their greatest contributions.

Roche's entire interactive testing program for sales personnel is stored in the division's data base. Sales representatives attending career development courses can take the tests using teleterminals and CRTs in the Montclair, N.J., training facility.

In addition, 12-pound, portable terminals are available for use in field offices or at home. With these terminals, salespeople can gain access to the interactive testing program anywhere in the country by means of a local telephone call, via the Mark III network.

Visible Measure of Progress

"We are extremely pleased with the way all our testing programs are working on the service," Kleiner said. "They are providing exactly what we need by giving our sales representatives instant feedback and a visible measurement of their progress.

"The interactive testing program also reduces the administrative load on our nine career development trainers, giving them more time to work with individual salespeople," he said.

Bob Braden, a career development regional trainer, fully agreed. Braden indicated that the service helps with virtually every aspect of training and testing.

"Our field force data base contains a tremendous volume of information about our sales representatives, including their education, achievements, prior experience with other pharmaceutical companies, courses and seminars completed and scores on Advanced Qualification Program (AQP) tests. This data helps us determine when a sales representative is ready for additional training and which courses are most appropriate," he explained.

"Initially, we tried to use in-house computers to administer our interactive testing program, but the system couldn't accommodate our needs," Braden said. "The CPU simply couldn't handle the loads we put on it."

In contrast, as many as 20 salespeople now can take computerized tests simultaneously, ranging from such areas as anatomy, physiology and the nervous system to federal regulations on controlled substances. "With our current interactive testing, a person learns by doing," Braden said. "He gets immediate feedback, which reinforces his learning."

Each test question is multiple-choice and if a person fails to select the proper response, the computer provides a reference for finding the correct answer. Braden indicated that the interactive testing program is a great help in preparing sales representatives for the rigorous AQP test, which is administered annually. All AQP questions, answers and sources are computerized and the tests are administered on CRT terminals.

"Throughout all our testing," Braden said, "downtime has been negligible." According to Kleiner, career development has experienced no loss of training time as a result of program problems.

"Our training is geared toward developing and improving our sales force's professional, technical and communications skills," Braden added. "MARK III Service helps show our sales representatives where they are in terms of their learning. This greatly reduces anxiety about taking qualification examinations.

"In fact, we found that if people aren't given access to the interactive testing process, their apprehensions about taking examinations are heightened," he said.

Career development training programs are available to all qualified salespeople. These include basic clinical rotation programs at major medical teaching centers and graduate-level clinical programs at leading medical centers in psychiatry, anesthesiology, clinical pharmacology, cardiology and infectious disease.

The clinical rotation programs allow Roche sales representatives to gain a firm grasp on therapeutic decision-making by observing resident physicians for two weeks, Braden said. "Ob-

(Continued on Page S/22)

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In fact, it's not a Data Base Management System at all, rather the world's most advanced TP Monitor. But TP is one of the most critical elements of an effective DBMS System. The trouble is many users select their DC as an afterthought resulting in a significantly compromised DB/DC environment.

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Data Base Environment Changes Users' View

(Continued from Page S/2)

potential keys and the query capabilities of the data base system may be employed to investigate questions such as those posed above, and a broad spectrum of arbitrary inquiries that go well beyond them.

This aspect of data base allows the user to expand his thinking. With the data and its derivative information available in arbitrary, easy-to-specify form, the thinking that he would devote to the process of manufacturing the information can now be diverted to exploring some of the horizons such information makes available.

Thus, the advent of a data base system environment on which the end user depends for his DP support may indeed radically modify the way in which he envisions his function, plans for its operation and finally carries it out.

Organizational Management

It has been said that a successful data base system that achieves a high degree of data-based DP must necessarily become a model of the organization itself. That is, an organization's activities at present and as projectable into the future are to a very large degree dependent on the ways in which information flows through the organization and interacts with the organizational elements that process, manipulate and employ it.

A data-based DP environment, in which a significant amount of the information processing of an organization is supported by data base, is therefore a mirror of this information flow and as such forms a model of the organization's activities. In this context, then, where information flows from point to point throughout the organization, the model of organizational management becomes one of monitoring performance at critical points of interest, and synthesizing the information thus gathered into tactical and strategic planning. This represents the true function of organizational management.

Thus the data base system environment not only provides the model of the organization in the sense described above, but because of the access that it offers to the data base, which in turn is part of the data base system environment, it is clear that the monitoring of informational flow in the organization is the equivalent of inquiring into the data base system.

Obviously any data base system that incorporates services to support organizational management is one that is prepared to offer that management new latitudes of flexibility. In fact, in terms of management functions this may well represent new dimensions of organizational control.

It is the accuracy, responsiveness and timeliness of information about the organization and its operation that gives this dimension meaning and ultimately makes it one of the most powerful motives for considering the data base approach.

Systems Development

The third strong motive for considering the data base approach has to do with the development of new application systems. As pointed out earlier, the file-oriented approach looks at each problem separately. We specify a problem, derive algorithms for its implementation and directly associate programs with data in files.

This implies that the data has essentially one functional application, so that any subsequent use of the data demands that it be abstracted from the file, reorganized to suit the needs of the new application and replicated for that purpose. The data is redundant, but furthermore a new application also requires the development of additional programs to prepare, present and maintain the data.

In the data base system environment, one of the major virtues is that the data base provides data as a community resource for its community of users. Thus data in the data base is available to all current users (up to privacy and security considerations) and therefore becomes a major building block — already constructed — in the planning and implementation of new systems development.

If the data base grows, this resource of already-developed data modules grows as well, and one consequence has to be that system design and implementation schedules are ultimately foreshortened, since new systems build primarily on what currently exists.

This point becomes more forceful when one considers that application programs in a data base system environment are effectively I/O free. That is, all I/O activity that leads to data presented to an application program in a data base system environment is carried out on behalf of the application program by the data base management package. This is achieved by the application by means of a subprogram CALL.

Thus there is no direct I/O activity and its associated logic need not appear in the application program. As a consequence, the application program itself is less complex; easier to write, debug and document; smaller in the execution environment; and achievable in greatly contracted schedule time.

And finally, this approach to application program development offers an unparalleled opportunity for standardization and documentation.

Cohen is president and founder of Performance Development Corp. in Princeton, N.J.

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Mobil, RCA Users Discuss IDMS Techniques

(Continued from Page S/5)
study of the IDMS software at Mobil's French affiliate in 1976. Mobil Oil Francaise and the English Mobil Data Services Ltd. have used IDMS since 1977. The company's German, Italian and Japanese affiliates also anticipate using IDMS.

The committee is chaired by Stephen E. Storey Jr., who is manager of commercial applications. After each meeting, a report is written up and distributed to interested Mobil affiliates throughout the world.

Second Meeting

At the group's second meeting in Paris last July, attendees reviewed Cullinane's Integrated Data Dictionary (IDD). The IDD is an add-on package to IDMS which maintains up-to-date information on the location, definition and status of a corporation's entire data resources.

Cullinane's Casey was at the meeting and discussed the system's fine points with Mobil representatives.

"As a result of the French affiliate's study of the IDD and our July review meeting," Allen, the Mobil Group's spokesman, said, "the Management Services Department now recommends the package for the affiliates' use.

"Although our affiliates are autonomous, they rely on the department's judgment," he explained. "Data base management is a broad area to cover, and we realize there's a lot to learn. We're using the committee to help us in the process."

Casey has attended user meetings at RCA as well as at Mobil and discussed Cullinane's own use of the concept. "We listen to user groups whether corporate, IDMS national or IDMS regional to evaluate our software products honestly and thoroughly.

"By continually responding to users' needs, we keep our clients ahead of computer technology. As a result, 99% of our users renew each year," he pointed out.

"This kind of interaction can be as useful to corporate management in improving data base techniques as it is to Cullinane as a vendor in improving its products."

'Trouble Log'

RCA's Craig Kellum, the Tacs product coordinator for IDMS, explained how the group's "trouble log" benefits both users and Cullinane. At each users' meeting, attendees write down problems they've experienced in running their applications. The entries are then discussed.

"By sharing our collective experience, we can see if the problem has cropped up before and if it is in the software or the program being run on it," Kellum noted. "If it is in the software, I can call in Cullinane to install a temporary program fix, and Cullinane can correct the bug in its next software update."

According to Kellum, RCA bought an initial version of IDMS in 1971. "Integrated data base technology has been around for a while, but management has only recently become aware of it," Kellum stressed. "You can see the trend in the increase of users within RCA alone.

"In 1975 we changed to Cullinane's version of IDMS when we upgraded from our Univac Spectra 7s to the IBM equipment," he continued. "At that time we went from one to three users. In the last couple of years, that number has jumped from four to 12 users."

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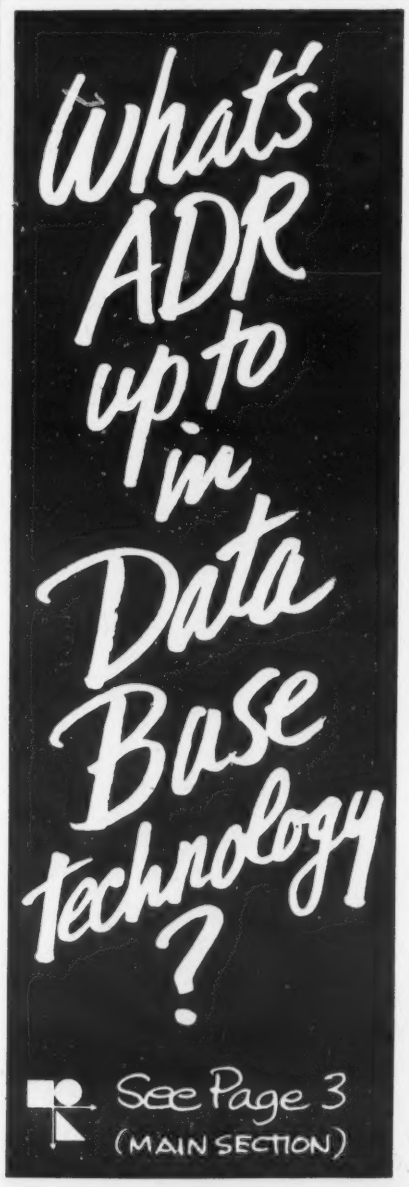

Planning Can Help Cut Chance of DBMS Flop

(Continued from Page S/12)
have a major responsibility for keeping applications functioning during the conversion process. Many companies choose to make their data administrators totally responsible for the conversion effort, but these individuals do not usually hold a high enough management position to be effective in running a project organization that does not exist administratively.

A DBMS project manager who has the most success is the one who knows the company's objectives, understands the functioning of the internal user departments and their applications and comprehends the DP implications of a DBMS.

Applications Conversion

Not every application can or should be converted to the DBMS. Three classes of applications can be defined: the candidates for immediate conversion, those that will be converted at a later date and those that will either remain unaltered or be replaced.

Phased evolution into the DBMS environment should be a major goal, and the primary candidates for conversion should include only those that can be run in parallel to test the conversion results.

Too often, analysts and programmers see the DBMS conversion as an excellent opportunity to introduce changes in an application or program. What they do not realize is that the expectation of failure during conversion is directly related to the number of unnecessary changes made. Save the modifications and enhancements until after the converted software has proven reliable.

Because of their involvement in the conversion planning, end users will be able to provide feedback that will be extremely useful in determining the success of the DBMS installation and in recommending future data base applications. This feedback also provides the information necessary to make the installation plans more flexible; usage requirements for data are too dynamic to force adherence to a rigid conversion procedure.

The price tag on a DBMS is only the tip of the iceberg. While the software may cost anywhere from a few thousand dollars to more than $200,000 to purchase, this amount does not affect the true cost of ownership.

Maintenance fees, training fees, installation charges, documentation costs and consulting fees are not always bundled with a DBMS. Other software enhancements, like changes in the operating system or the addition of a compiler, will also add to the start-up cost.

Serious thought must also be given to the existing hardware in the company. The DP systems may not have the capacity to handle the proposed data base environment.

Although improved DP efficiency and reduced data handling are two of the benefits of using a DBMS, there is a trade-off in the need for a large amount of main and mass storage. Some systems require overhead exceeding 10 times the size of the data in order to operate; other systems have an almost open-ended requirement for overhead based on the number of linkages requested between data records.

It is not uncommon to hear stories of installations increasing their hardware capacity simply to handle the unexpected load generated by the data base software.

What if a DBMS does not exist for the hardware currently being used? This question hits most second-generation shops very hard, but it also affects companies which cannot find an adequate DBMS for their hardware.

Political and budgetary factors can determine what additional hardware may be considered. For second-generation shops, the cost of a

(Continued on Page S/26)

SEED ON MODCOMP

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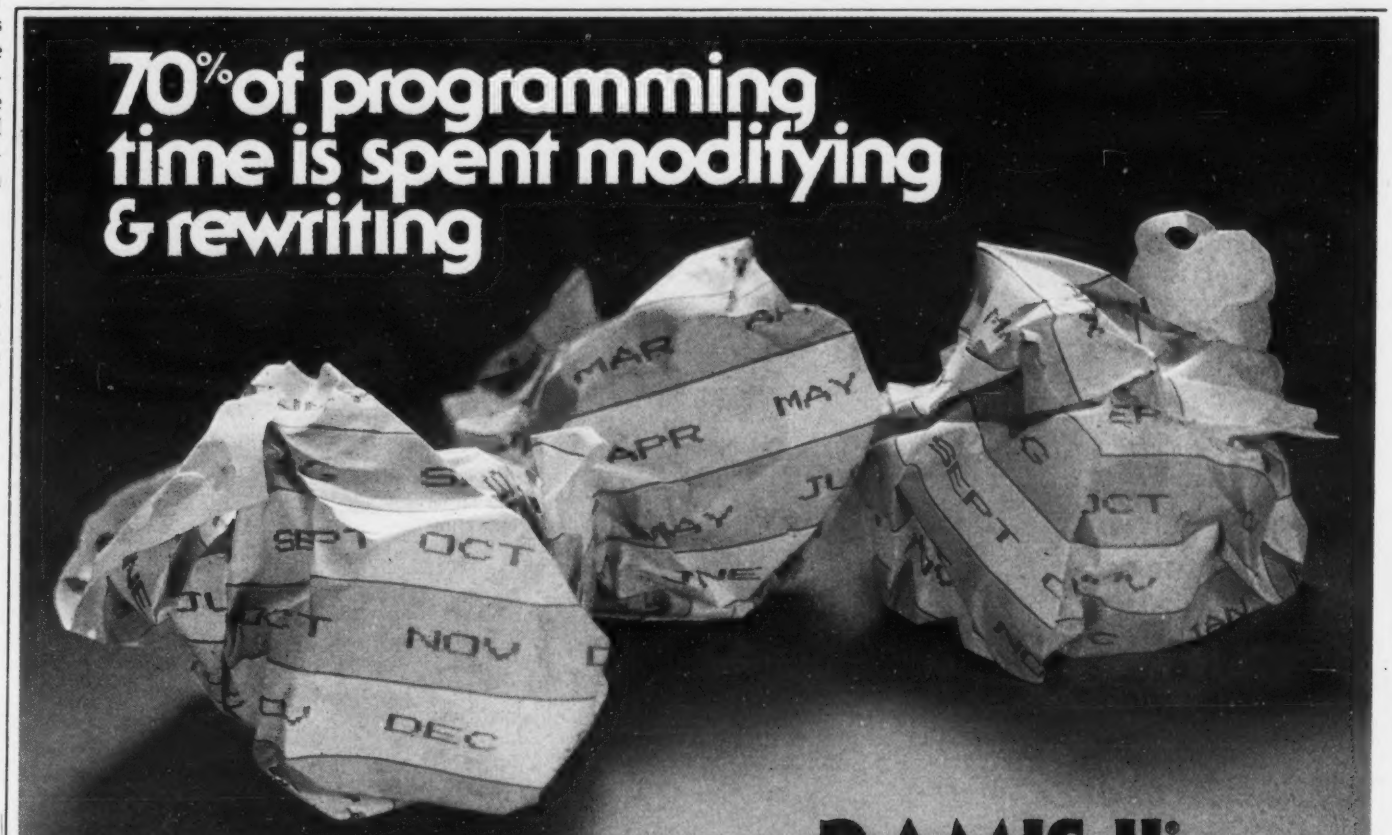
70% of programming time is spent modifying & rewriting



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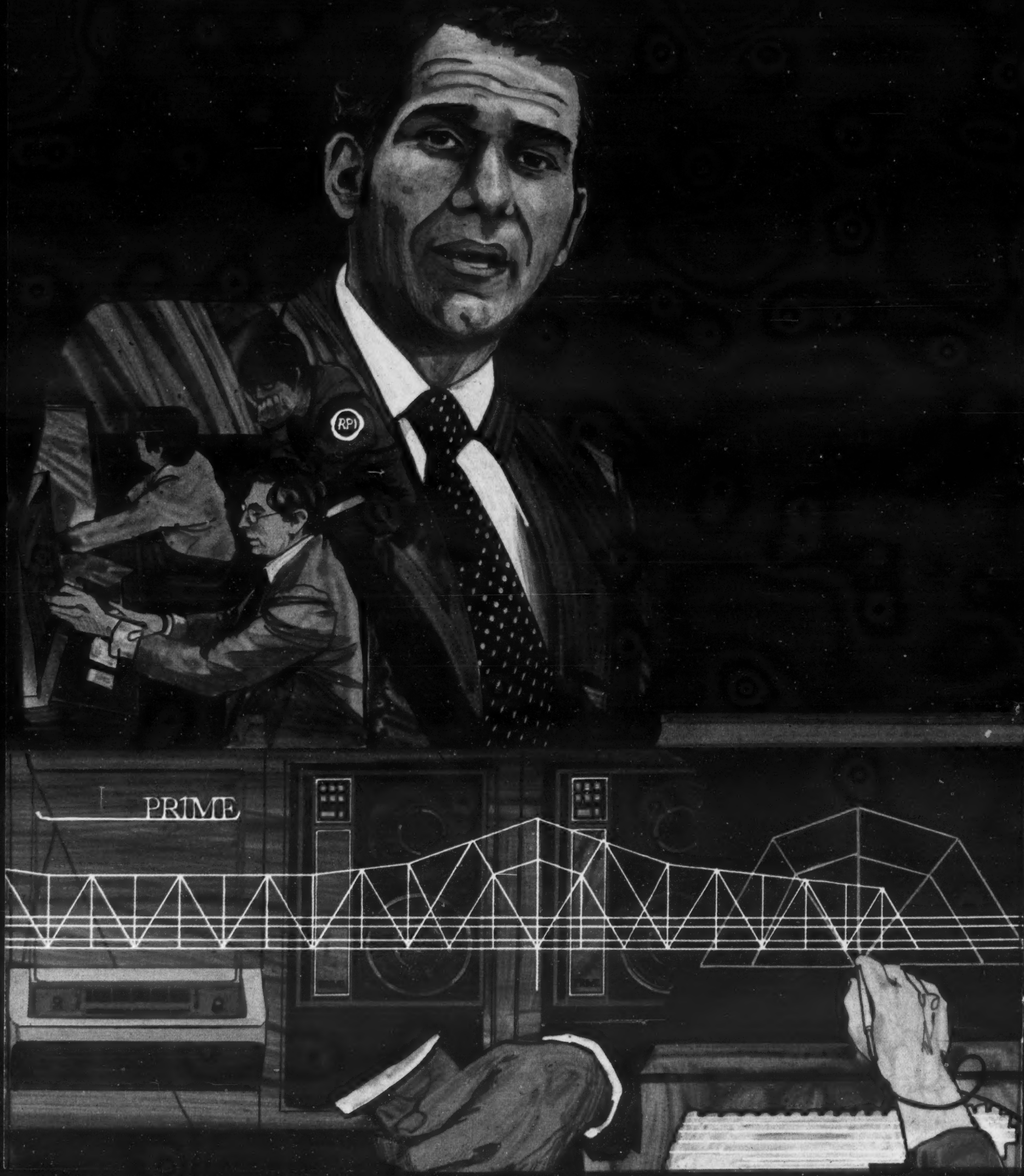
"Conventional computers only give students correct numbers. Computer graphics develops engineering intuition."

Dr. George S. Ansell, Dean of the School of Engineering, Rensselaer Polytechnic Institute, Troy, New York



Engineering educators at Rensselaer Polytechnic Institute, one of the country's top technological universities, believe that interactive computer graphics offers students, especially undergraduates, an intuitive, visual understanding of engineering problems and concepts that conventional computers, with their emphasis on abstract data, have failed to provide.

To put that belief into practice, RPI needed a computer powerful enough to support 36 interactive graphics terminals simultaneously, and versatile enough to meet the needs of multiple engineering and scientific disciplines. They chose dual Prime 500 interactive timesharing computers.

Prime's family of interactive computer systems offers industry standard software including FORTRAN IV, BASIC, RPG II, COBOL, and a CODASYL-compliant Database Management System. They also have greater memory capacity than any other family of small computers: up to 8 million bytes of high-speed main memory, 2.4 billion bytes of disk storage, and 32 million bytes-per-user of virtual memory.

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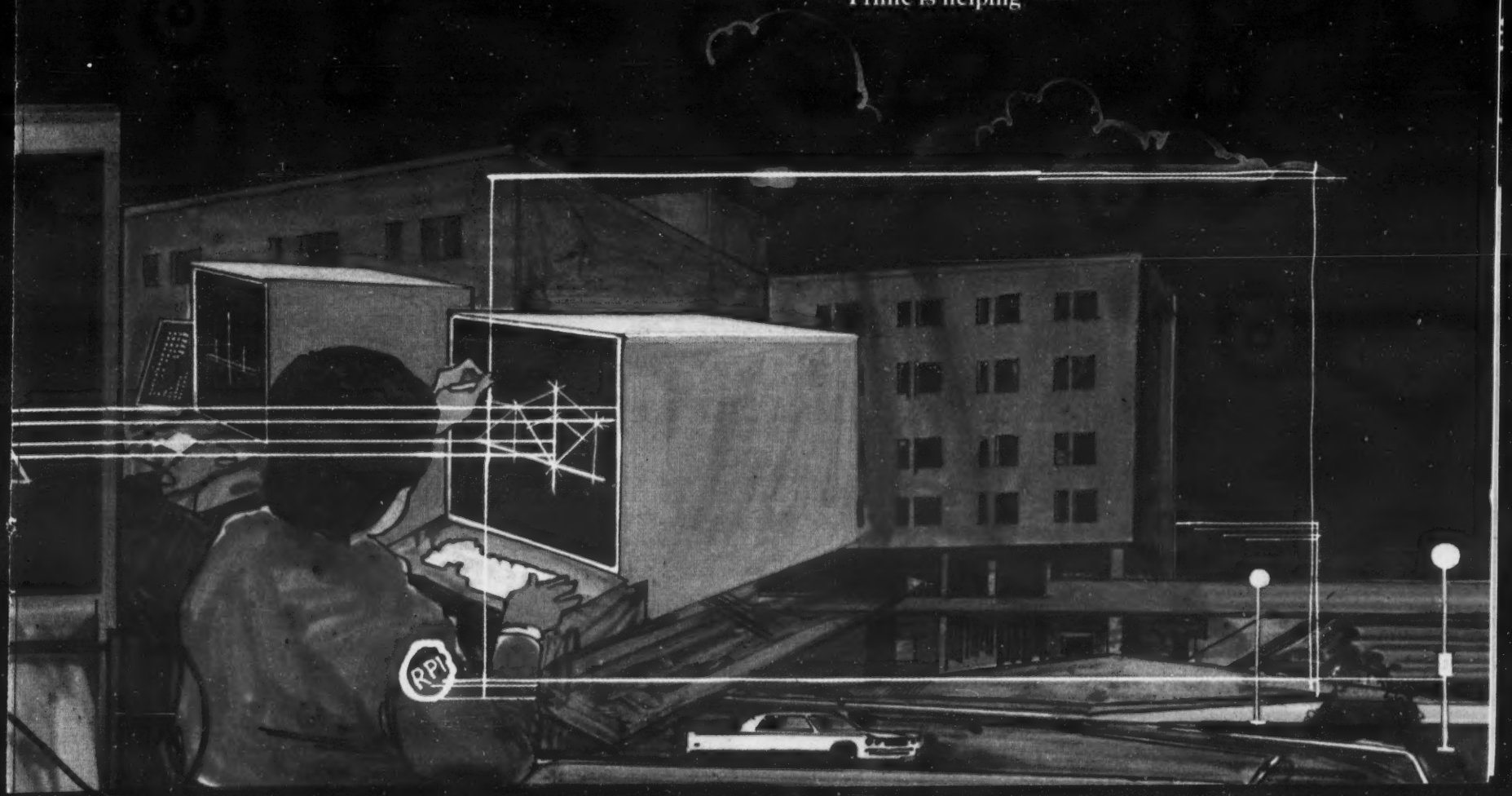

Turning Back to Users

What Will Come With Third Age of DBMS?

By Scott B. Guthery
Special to CW

Generations of computer hardware replace one another. Generations of computer software accumulate. When the movers come and wheel out the trusty old D/5 machine and wheel in the brand new E/6, something discrete and identifiable has taken place.

The purchasers of the new E/6 will call it a new generation. Software, however, doesn't come and go. It spreads.

To be sure, some *numbers* change. Fortran II was followed by Fortran IV and Snobol 2 by Snobol 4B. But there just doesn't seem to be the same kind of breathless anticipation for PL/II as there is for a new breed of machine.

The first problem is directionality. Machine performance measures are generally agreed upon, and new machines score higher than old ones. They are faster, lighter, smaller, more reliable and so forth. We know where we want to go and how to measure our progress in getting there.

This is certainly not true of software products. An "improved" version may be slower, bigger, harder to use and less reliable than the old version and yet tout itself as ushering in the dawn of a new age of productivity.

The second problem is research activity. One is currently hard pressed to find hotbeds of delay tube development or sense switch engineering — although the flying spot store is making a comeback. The general rule of thumb in hardware is that if you know about it and it's not being worked on, consider it part of a past generation.

In software, everything is being worked on all the time. The names may change and the problems may divide and multiply, but the work plods on and the same answers are found again and again. Software doesn't wear out, but surprisingly few people act as if they understand this.

In spite of these observations, I contend there are currently three identifiable generations of data base management software. During the first generation, designers looked toward the users and built automated analogs of the data base management systems (DBMS) they saw these people using.

During the second generation, the designers turned toward the machine and built efficient and stable versions of the objects they found themselves dealing with in the first generation. In the looming third generation, the designers will turn back to the users and automate the processes they use to handle these objects.

Old Ways

New technology is typically first used to do old things in old ways. Thus, for example, atomic power was used to blow things up. Data base management software is no exception to this rule.

During the first generation, roughly 1940 to 1965, data base management software was basically a punched card rendition of the data handling systems its designers found in use at the time. Work schedules became flowcharts and everything that wasn't nailed down in the accounting office or the file room was cast as a program or a data set.

This behavior by the system designers was purely defensive. For fear of being found wanting — that is, not being able to deal with some quirk or special case — the designer automated everything in sight.

That way, when someone wanted to know if provisions had been made for the 3- by 5 in. card that came over Tuesday afternoon from the peppermint shoelace division with the hog belly forecast that had to be part of the Wednesday financial report, the Thursday division activity report and the Friday 3- by 5 in. utilization report, the designer could just point and say, "We do that here."

This happy state of affairs — automate what you see — could have continued undisturbed had not someone observed a computer is something other than a file cabinet. This time, after the bomb went off, the ground glowed in the dark.

New Ways

This realization did not come, as one might have expected, from the people who had to use the systems the designer built. Perhaps his software copies were so much like the originals it was impossible to tell them apart.

Rather, the origins of this realization are to be found in events totally unrelated to the quiet ebb and flow of business statistics. What happened was the solid rock of Gibraltar from which the designer cast his automation net — the computer — began to go through a kaleidoscopic series of changes.

During the second generation of data base management software, say 1965 to 1980, the designer was forced to turn inward — away from the user and toward the machine — to study the intrinsic nature of the tool he was using.

This is not to say there were no cries of anguish from the outside world. "What do you mean it's going to take you six months to convert these programs? I just spent four million bucks for a brand new Whizzer 3608. I want my work done faster, not slower!"

(Continued on Page S/24)

"Thanks to MARK IV,® our users have beaten the computer room waiting line!"

Founded in 1892, Great-West employs 4,000 people, carries $43 billion in insurance annuities and has $3.3 billion in assets. It is Canada's largest life insurance company in terms of insurance income and the 14th largest life insurance company in North America in terms of total insurance in force.

"As the methods of storing and manipulating data become more varied and complex, the need for easy user access to this data has increased. Even though our 370/168 attached processor with MVS operating system gives us substantial computing power, and we have over 100 programmers and analysts, the company's demands on these resources are tremendous. User requests create an ever-extending queue because we simply could never do all they wanted us to do.

"With MARK IV, our users can get the information themselves, often in quite sophisticated ways. Thanks to MARK IV, they've learned how to avoid the programming waiting line. And from the feedback I'm getting, they're very pleased with this new environment!

"MARK IV has also had an impact in our Computer Systems area. We have developed some complete systems, using the many powerful capabilities of the language, such as transaction processing and file coordination. Even though the programmers were relatively inexperienced with MARK IV, they indicated the development times were considerably shorter with MARK IV than with PL/1.

"Most programmers show resistance to a new tool like MARK IV, but once they have used it, they come back to tell me how much they like it. It's the thrill of getting results!"

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Package Helps Purina Analyze Market Forces

By P.K. Misra
Special to CW

Ralston Purina Co. is the world's largest producer of dog and cat food and of commercial feeds for livestock and poultry. It also produces many of the products found on supermarket shelves and is engaged in several other businesses. Purina employs approximately 67,000 people worldwide and its total annual sales in fiscal 1977 were $3.8 billion.

The need for a marketing information system led to the purchase in January 1977 of Ramis II from Mathematica, Inc. Before installing the system, we made some basic assumptions regarding our business and information requirements.

Because the consumer products industry is highly competitive, there is a strong need for quick access to all information. In addition, since the useful lives of data sources are unpredictable and modeling and analysis requirements are difficult to project long-term, system development time must be kept minimal.

In view of these assumptions, developing a conventional system was ruled out. Instead, Ralston Purina concentrated on acquiring a package that would give it flexibility.

Desired Attributes

The following attributes were considered necessary to support the projected system: reporting control, summing control, cross-tabulation, graphs and statistics.

Also, compatibility with the management information system (MIS), future growth, user input, table lookup, catalog commands, diagnostics, textural control, IBM compatibility, English-oriented language and interactivity.

Also, a dictionary, host language, multifile capacity, security, retrieval logic, secondary files, batch language, summary file, external functions and on-line maintenance.

Ramis II met these requirements and enabled Ralston Purina's Customer Products Group to implement a comprehensive marketing information system that integrates internal and external data in an on-line, interactive environment.

'Ralston Purina aimed to provide relevant information — in a real-time interactive environment — to its users, while keeping down costs.'

At present, data available through the system occupies almost 300 million characters and comes from sources including: Sami statistics, which detail warehouse movements; MIS sales, which provide information concerning factory shipments; and retail distribution information, which is based on store sales. Other important sources are: progressive grocer data, which provides information on store types and volumes; demographic information; and National Family Opinion Pet Ownership data.

Input from sources such as census data, economic indicators, advertising information and consumer research survey findings may be added in the future.

Two modeling applications — dealing with areas of dominant influence and brand forecasting — have been implemented, but our efforts have concentrated on making information available for quick access and reporting.

Among the reports produced using Ramis II are brand development indexes, dog food competition data, re-

(Continued on Page S/28)

Are Database Developments Making You Obsolete?

You know that database developments will affect your business and your career. But you can't afford the time to read dozens of database books or go through expensive training. How can you stay on top of this important subject?

Database: A Professional's Primer is a new book written for people like you. It's designed as a direct-access device. Its top-down modular presentation puts database at your fingertips. You won't search endlessly for the information you need. The book is filled with features to lead you to the facts you want, when you want them. Features include

- A control module that summarizes database techniques and vocabulary.
- Three independent submodules that provide in-depth explanations of database concepts, systems, and applications.
- A VTOC (volume table of contents) that covers every topic and subtopic in the book.
- Extensive cross-references (linked lists) throughout the book, to lead you to the information you want.
- A comprehensive index (inverted file) that pulls together references to every topic in the book.

These features make *Database: A Professional's Primer* simple and efficient.

What Makes This Book So Good?

1. *Coverage.* Up-to-the-minute information about database concepts and systems. Not just theories, but practical facts about these systems, how they work, their advantages and drawbacks — facts you need to make informed decisions.

2. *Authority.* David Kroenke, the author of *Database: A Professional's Primer* is uniquely qualified. He's a computer professional, a database consultant both to computer manufacturers and business. He's a successful author — his first book, *Database Processing*, is one of the most readable and popular college textbooks on database. Right now he heads a database development team for a major corporation.

3. *Readability.* It's not the Great American Novel, but this may be the most readable book on database you'll find. It's carefully edited and clearly illustrated to make database concepts simple to understand. *Database: A Professional's Primer* is easy to read, easy to use, and won't waste your time. You might read it just for fun — it's that good.

4. *Organization.* Because of its top-down modular approach *Database* can be read in any order. Every module stands alone, so you read only those parts that interest you. Do you need a quick synopsis of a topic? Read the control module. Need more information? Follow the cross-references to in-depth explanations in other modules. The book is flexible, designed to meet your individual needs.

How Can You Use This Book?

For the sake of your career, you need to be on top of database developments. No matter what job you hold — programmer, analyst, manager — database developments affect the whole data-processing industry. *Database: A Professional's Primer* is designed to keep you from lagging behind. Here are some ways the book might be used:

• *Applications Programmers* You're seeking a job in a shop using TOTAL. Your database experience is limited. In order to present yourself in the best light, you need to understand the concepts (and jargon) the shop uses. Reading the systems overview and the TOTAL sections, you'll get familiar with the terminology you'll hear at the interview. You won't be an expert, but you can show how your programming experience applies to the job.

• *Systems Analysts* You must decide whether ADABAS or IDMS would be better for your organization. Before contacting vendors, you read the control module, two sections in the systems module, and a section in the applications module. Now you can ask the vendors intelligent questions (and you'll understand the answers).

• *Data Processing Management* You're the director of a database system. You want to create a new position — database administrator. The personnel department asks you to spell out exactly the requirements and duties of the post. Using two sections of the applications module, you define the position clearly, and improve your chances of getting the person you need.

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Find out for yourself. Take advantage of our money-back offer. Read your copy of *Database: A Professional's Primer* for 15 days. Check the contents. Read the sections that interest you. Discover just how clearly it's written. If it isn't the clearest, most helpful database book you've ever read, simply return it, with the packing invoice, for a full refund. We'll even pay return postage.

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Dear John Letter

See Page 3
(MAIN SECTION)

Real Value of DBMS Lies in Use, Not Theories

(Continued from Page S/11)

able gives anything remotely approaching "complete data independence." Further, no DBMS currently proposed or contemplated will do so either.

Structure Not 'Infinitely Plastic'

A DBMS can give relatively greater data independence than a traditional tape or disk file. But a DBMS implementation remains a structured collection of data and neither the content nor the structure of the data is infinitely plastic.

Every DBMS — whether flat file with index, hierarchical, network or relational in design — has inherent limitations in its data definition language, data manipulation language and structure that make data independence no more than a matter of degree. As anyone who has struggled with third-form normalization of a relational data base or complex inquiries (to say nothing of updates) in a network DBMS can attest, data independence is a highly oversold feature of DBMS.

Breaking up complex data into multiple indexed files, a hierarchy, a network or a set of relational tables will always require decisions regarding a number of trade-offs. Retrieval efficiency, ease of use, liability to insertion and deletion anomalies, economy of update, flexibility for reporting purposes and ease of maintenance are among the factors that will be affected. A sensible DBMS user should be aware of this from the start.

The theoretical capabilities of an ideal DBMS are not and will not in the foreseeable future be available in a practical implementation.

In fact, network and relational implementations, pretty as they may be from the academic point of view of set theory or of relational algebra, frequently offer no significant advantages in practice over a well-designed hierarchical system and are more costly to run for many applications. There is a big difference between theoretical elegance and practical utility.

DBMS can be tremendously useful. They do give a great deal more flexibility in defining and manipulating data than ordinary file-oriented DP systems. They can drastically shorten the amount of time required to implement computerized information systems and reduce personnel costs for implementation in the process.

With natural language retrieval capabilities, a DBMS can also offer an extremely flexible and powerful means of access to data. Nothing said here detracts from these facts.

A DBMS, however, cannot do everything. It is merely a sophisticated tool whose real meaning is in its use.

Zachmann is technical support manager for CallData Systems, Inc. at the company's Boston offices.

System Teaches Drug Salesmen

(Continued from Page S/13)

viously, if a person is going to 'walk in the shoes' of a physician, he's going to have to prepare himself," and we have a number of courses designed to do just that.

"Our field force data base, which we access with DMS II, helps us determine which salespeople are eligible to attend a particular clinical rotation program at a given time," Braden said. "Another important benefit from our system is our ability to document the training and experience of our field sales force."

Braden pointed out a number of benefits from Mark III. First, he commented on reliability. "It doesn't matter where or when we want to use the system, it's available," he said.

"System versatility is also important, as our company and department continue to grow. Today, our data base, interactive testing and AQP may completely meet our needs. Tomorrow, however, we may suddenly discover that we have a new requirement.

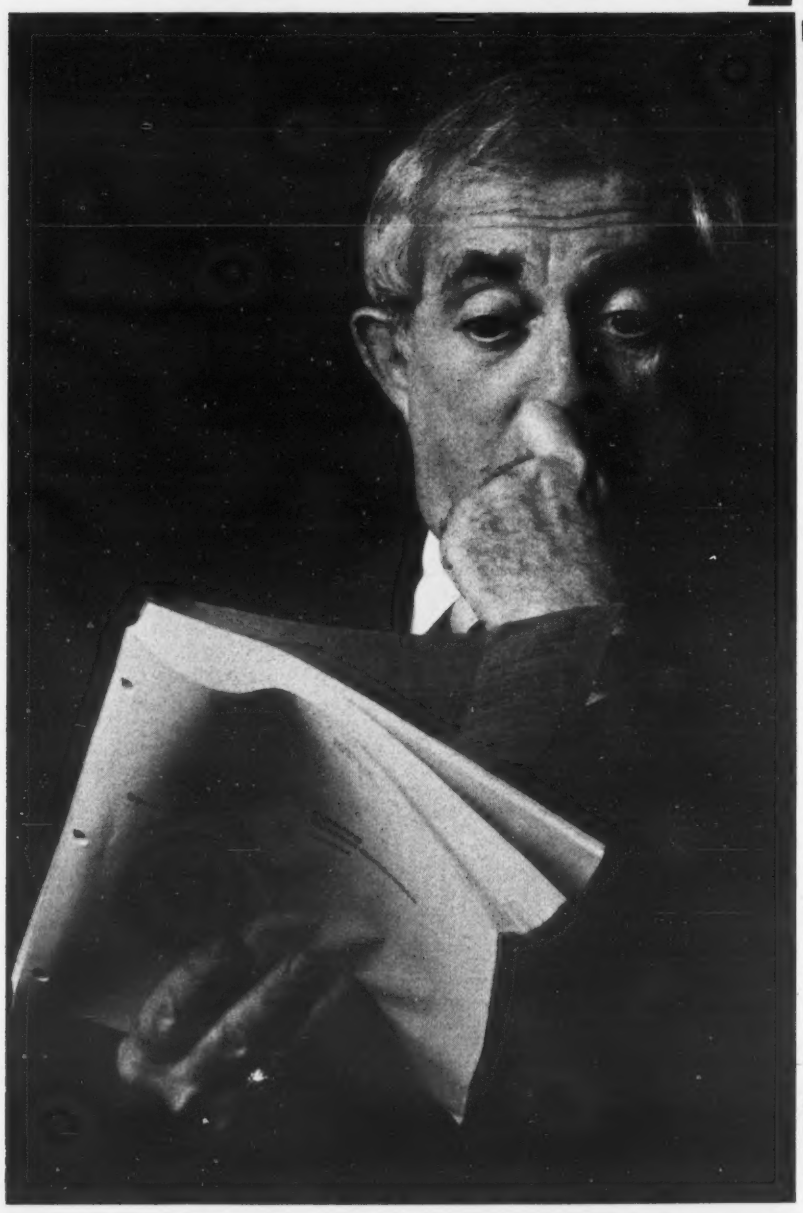
"When this happens, we don't have to discard what we already have. We can add to the system by calling in GE Information Services personnel," Braden said.

"Our service from GE has been excellent," he continued. "If we should require special programs, we know the Custom Applications Operation is readily available. This type of service is essential to us, since we are not DP experts."

Kleiner said Roche Laboratories will be seeking more field applications for its system in the coming year. Every division in the country will have a portable terminal to help sales representatives with on-the-job training at work and at home," he said.

Braden concluded, "The applications for our system really seem unlimited. I'm sure we have only scratched the surface of the capabilities we have for data profiling of our human resources."

Take a hard-nosed look at the software you're using.



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SEED ON PDP 11
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Increases Security, Control

DBMS Regulates Medical Center Business Data

NORTH BEND, Ore. — A terminal-oriented, general-purpose business computer and a data base management system (DBMS) have combined to form a powerful business tool for the North Bend Medical Center here.

The center houses 20 doctors in separate offices, as well as an X-ray and blood lab. More than 200 people per day visit the doctors, including 10 first-time patients, who must be registered prior to treatment.

Tasks performed at the center include patient billing, insurance reimbursements, medical supply purchasing and distribution, as well as payroll and personnel administration for the doctors' staffs.

Prior to the installation of its system, the center handled all of those functions through a service bureau. All daily transactions were entered on a remote job entry (RJE) station and then batched into the service bureau's system at night.

Once the data was transmitted, the service bureau sent back a listing of transactions as verification of receipt.

Problems Ensued

This type of business processing became cumbersome as the patient and insurance carrier billings multiplied.

In addition, the charges for processing larger volumes of data grew.

The clinic's administrative staff found it harder to control the clinic's day-to-day business. To receive a report on insurance company payments for the year required a special request to the service bureau.

Often, several weeks passed before the service bureau could run a program against the clinic's data, if that type of program was even available. As the need for special reports grew, DP costs increased.

Opts for In-House

Early in 1978, the clinic's board of directors decided it would be a good idea to bring the DP functions in-house. In June 1978, the medical center installed a Hewlett-Packard Co. HP 3000 Model 6 system with 384K bytes of memory and 100M bytes of disk storage. The computer and the applications software were supplied by Umpgua Data Factory (UDF), an Oregon-based systems house.

"The applications software package supplied by UDF is called Patient Accounts Receivable and Insurance (Paris)," Don Conner, the center's director explained.

"With this package, which is based around HP's DBMS — called Image — we are able to register all new patients on-line.

When service charges start to accrue after registration, the clinic already possesses the information necessary to monitor patient treatment, insurance claims and personal patient billings. We process 2,000 to 3,000 such transactions per day, not counting account status inquiries," Conner pointed out.

Query Assists

"Another major management tool is HP's Query. With Query, we can search the patient data base and produce exception reports without writing a program.

Query responds to English-language commands such as FIND, LIST and REPORT.

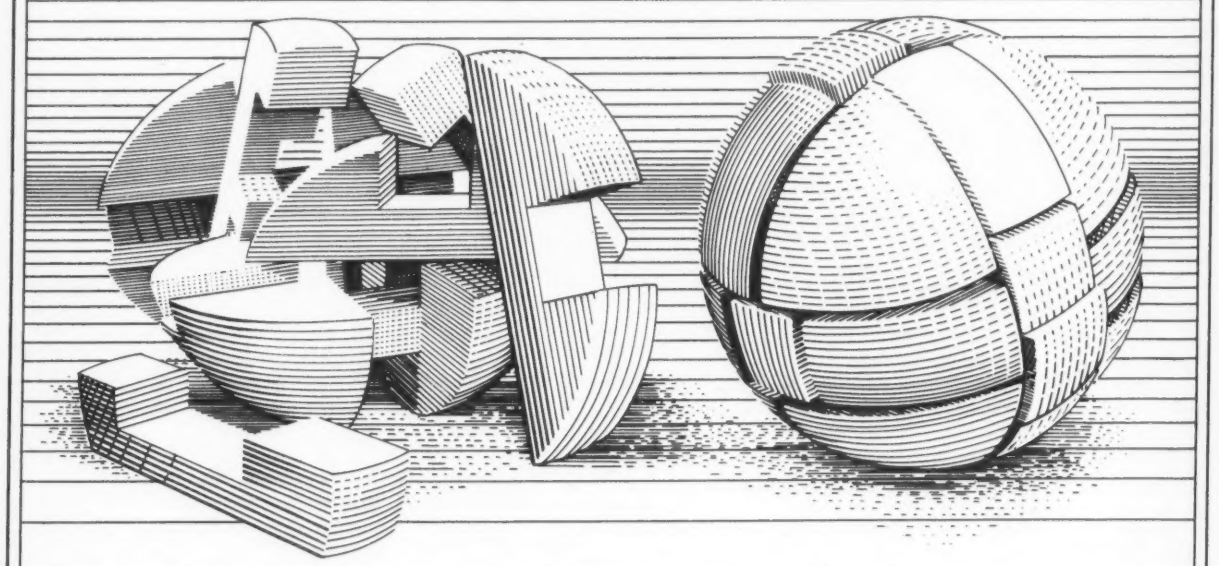
An example of the control Query gives us is in cash flow monitoring. We receive payments from many sources — patients, welfare, federal agencies

(Continued on Page S/29)

What's ADR up to now?

See Page 3 (MAIN SECTION)

Theirs. Ours.



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Third Age of DBMS: Turning Back to the User

(Continued from Page S/20)

But the fear went deeper. The designer had barely kept afloat through the waves of shifting requirements and rewritten specifications. If his trusty craft now took a new form every six months and, if its operating manuals were growing exponentially, he was in real trouble.

Clearly his first duty was to his own continued existence. If he wasn't captain of his own ship, he was lost for sure. Thus data independence was born.

Imaginary Computer

What the designer did was simply make up an imaginary computer. Call it a data model, a data definition language, a conceptual schema or a Codasyl standard, the result was the same.

Now, rather than having to build his boss' data castles with some far-off electrical engineer's blocks, he could play with his own blocks. The heat was off. "You give me these blocks and I'll give you that castle," he could say.

And he looked forward to quietly sitting at his desk and playing with his shiny, new blocks. But meanwhile, a very different thing was happening.

Given new kinds of blocks, people will build new kinds of buildings. The arch had to wait for the keystone and the cantilever for prestressed concrete slabs.

It doesn't matter that the blocks are imaginary, the building will go on. Real buildings are engineering details.

'Third generation data base management software will provide the user with the tools necessary to bring substantive knowledge to bear on the act of computing itself.'

But building with second-generation software blocks is already going on in some very real ways as well as some largely imaginary ones. Under the guise of knowledge, engineering and heuristic programming, third-generation DBMS are taking some substantial first steps.

Designers of these fledgling systems have turned away from the machine and back to the user. This time, rather than trying to render the data structures they see, they are trying to get at the reasons behind the construction of these structures.

The question to the user is not "What are you doing?" but "What do you want to do?" — a far more penetrating approach.

"What I am doing is sorting the records of file Alpha5.Data.H5900. What I want to do is find out if there is more lung cancer in New Jersey than in Wyoming." The difference is fundamental.

Second-generation data base management software is, as we have already noted, machine-oriented. The First Article of Faith of second-generation design is that any human data handling process can be closely approximated by one or more machine data-handling processes.

The actual construction of the approximation is, of course, left as an exercise for the user.

There is a reason that kits cost less than the finished product. They're even cheaper without assembly instructions.

Goal-Seeking Activity

To some extent, however, this problem must be left to the user. Assembling basic machine processes into a useful human process requires knowledge of why the process is being put together in the first place.

It is a goal-seeking activity whose success or failure can only be measured in the context of the problem at hand.

The bottom line is not five quick sorts, three fast merges and a state-of-the-art file inversion but a concise comparison of the lung cancer rates in New Jersey and Wyoming.

Users of second-generation software have no way of embedding context-specific information into the process part of a DBMS. They can use contextual information to build efficiency into the storing of the data but not into its handling.

Third-generation data base management software will open the door to this treasure trove of computing economies. It will provide the user with the tools necessary to bring substantive knowledge to bear on the act of computing itself.

Analogous to today's data models which contain important information on how to store the data, we will find procedure models which can be primed with substantive information on how to process the data.

The emphasis in third-generation data-base management will be on context-sensitive computing. The user will automate not only the structures from which the data are taken but also the techniques used to manipulate these structures.

Second-generation data base management software gave us data independence. Third-generation software will give us procedure independence.

This independence has been and will continue to be gained by moving away from the machine's reality and into the data's reality. The question of what reality the data is connected to will always be up for grabs.

Guthery is a partner with tiny-c Associates of Holmdel, N.J.

REAP THE BENEFITS OF DBMS

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PDP 11 RSX-11M

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DEC 10/DEC 20 TOPS

IBM 360/370 OS/VS, MVS

CDC 6000/CYBER NOS, KRONOS

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College Builds Student Information Data Base

(Continued from Page S/6)
the batch system, the chaining pattern shown in Figure 1 was used. Nine detail data sets were linked to the student master data set (Sismast) through student number. Some of the detail data sets were also linked to other master data sets through other key fields.

One example is the ACT-QTR data set, which was the set of all student/section records. It was linked to the master schedule of classes through section number and contains the student's identification number, name, date of transaction, section number and grade. This was the only occurrence of the student's name outside the Sismast data set and was there only to improve the speed of processing data for student inquiries and class rolls.

In order for a student to register for a class, or pay fees, or purchase a parking decal, etc., data on him must first be entered into the Sismast data set. From that point on, all references to the student are based on data in the Sismast data set, a single source for all data.

The factors that helped the college implement a student information system data base with on-line access were:

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• Time-sharing. This permits simultaneous use of the central computer by many users at the same time — a necessity during registration.

• Data security — This permits a regulated access to private data at all levels from individual items to the entire data base.

Gholson is director of academic computing services at George Mason University (GMU) in Fairfax, Va. Before coming to GMU in July, he was director of computer services at Walters State Community College for five years.

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Plans Can Reduce Risk

(Continued from Page S/17)
DBMS is added to the overall cost of bringing their DP into the 1970s.

In any case, the budgetary ax can fall heavily on a DBMS installation effort when the cost analysis fails to include all expenses related to the DBMS aquisition.

One analysis that is most often missing from a DBMS plan is a discussion of what it will cost the organization not to go to that DBMS. The figures are not always that concrete or that easy to obtain, but the total cost of conversion cannot be justified without some idea of the business trade-offs.

Depending on what the data base means to the company, lack of a DBMS may mean loss of business, higher personnel costs, marginal effectiveness in planning or reduced profit. If the cost of acquiring a DBMS exceeds the cost benefit to the company, then the need for it has not been proven, and serious thought should be given to abandoning the project before any purchase is made.

Kubilus has been involved with data base management for over seven years as a user, implementor, manager and educator. He is currently manager of corporate support services at Rapidata, Inc. in Fairfield, N.J. He is also an Association for Computing Machinery national lecturer.

SEED ON IBM 370
page S/24

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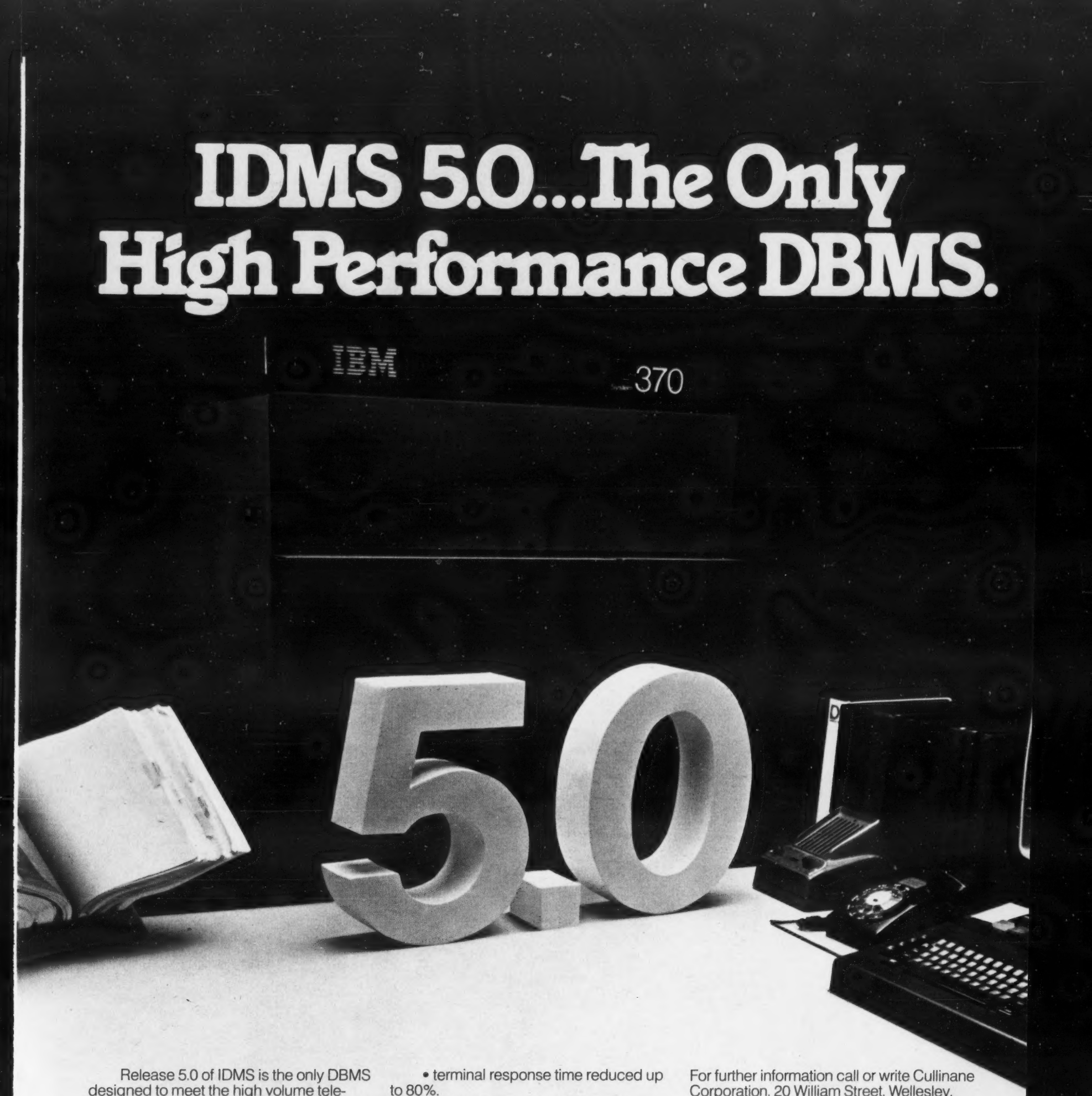

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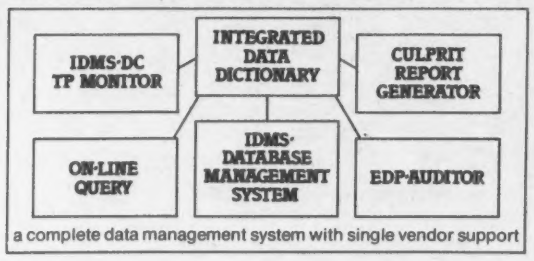

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Purina Gains Quick Access to Marketing Data

(Continued from Page S/21)

tail sales customer status and distribution reports and multiple-item distribution analyses.

In addition, Ramis II systems have been developed for Market Research Department project management, budget control and advertising research.

Ralston Purina aimed to provide relevant information — in a real-time interactive environment — to its users, while keeping down costs.

Its justification for acquiring Ramis II and building a marketing information system around it was based on a number of cost considerations: development effort savings (a conservative estimate of 2:1 was used), time-sharing savings, external reports savings, clerical effort savings, the cost of Ramis II, the cost of Ramis II maintenance and internal computer usage costs.

Annual benefits were estimated at $100,000, but actual results are well above initial projections. Moreover, it took only an average of nine man-days to develop each of the 15 Ramis II projects completed to date.

Before selecting Ramis II, 20 packages were screened; benchmarks and vendor presentations were carried out for five of them. Several visits were made to users in various parts of the country to gain from their experience. Ralston Purina's market research people were direct participants throughout this selection process.

Planning, by its very nature, requires flexibility. In today's competitive environment, it is almost imperative that marketing management have direct access to needed information.

It is to this point that we addressed ourselves, using an evolutionary approach, and we expect progress to continue, with more integration of different data sources and use of the system by new departments and divisions within the company. In fact, Ralston Purina is currently setting up prototypes for using the Ramis/IMS interface in other areas.

Misra is manager of planning systems at Ralston Purina.

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- Application Analysis Methods (2½ days)
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Helps Control Business Functions

DBMS Becomes Powerful Medical Center Tool

(Continued from Page S/23)
and insurance plans, Conner explained.

Query can report the total amount received in each of these categories and even average each category's individual payments. In a matter of minutes, we can identify the sources from which the clinic is receiving its funds. In addition, using Query, we can predict what our payables are for the week and compare the estimate against the cash received.

The way the Image data base links the data also allows us to see how much of the incoming funds belongs to each doctor, Conner continued. Query allows us to report how much income is being earned by each office."

Accuracy From Image

"The heart of the Paris package is Image," Jim Wilkinson of UDF commented. The combination of Image's network structure and security system enabled us to use the same information for different functional groups in the clinic, as well as relate data in different logical ways for reporting purposes, Wilkinson noted.

As an example, once a patient is registered at the clinic, that master information is available to the attending physician and the business office. We do not have to carry a patient's name, address and telephone number in three separate locations. This results in less disk space usage and also makes for better data integrity.

For example, when the patient moves, the clinic only enters one change of address transaction. The new address is now available to the business office and the patient's physician. According to Wilkinson, we never have the problem of carrying two addresses, one of which is out-of-date.

Security Aspect

"Another factor about data base management is the security aspect," Conner added. "Since we operate in a service bureau environment for all of the member doctors, the board of directors was most anxious about data security, However, Image maintains a security system that helps us control who is allowed to read data and who is allowed to modify it.

Image treats each individual data field as a separate entity. If a user attempts to look at a field of data, Image checks the user password to see if the user is allowed to read the data. If the user attempts to modify a field, Image checks him for write access.

We can allow our clerical staff to look at patient data but prevent them from changing it. Just because a lot of data is linked together by pointers does not mean it is accessible to everyone. According to Conner, this is a large step in maintaining the necessary confidentiality of patient records."

Programming Viewpoint

"From a programming point of view," Wilkinson explained, data base management gives us considerable data independence in the support of Paris. In the future, the center's information requirements may need to be adapted to changes in business practice, government regulation, or for some other reason.

This could cause additions to the number of data items in the data base. To accommodate, we would only modify the programs which access the new fields of data. Any programs which do not relate to the new data would be unchanged, Wilkinson noted.

Image allows us this freedom because it manipulates individual items of data, not the entire data record. A program retrieves only the items of data requested. The fact that more fields exist in a record than the program wants to handle is dealt with by the Image software, not the application.

Cost Savings

An application program requests and receives fields of data in any order desired, regardless of the physical order of the data in the data base, Wilkinson pointed out. "Images handles the deblocking for you," he said.

"We see cost savings everyday," Conner concluded. "Not only do we bill and submit claims in a more timely manner, but the entered information is more accurate and up-to-date. Inquiries about patient status are handled quickly using on-line terminals.

The final payoff is the control achieved by management. Query reports are available in minutes as opposed to days. Information is secure, yet it is readily available, the security and control over patient data is worth the price of our investment in a DBMS," Conner concluded.

'What Special Halloween Programming, Ms. Callaway?'

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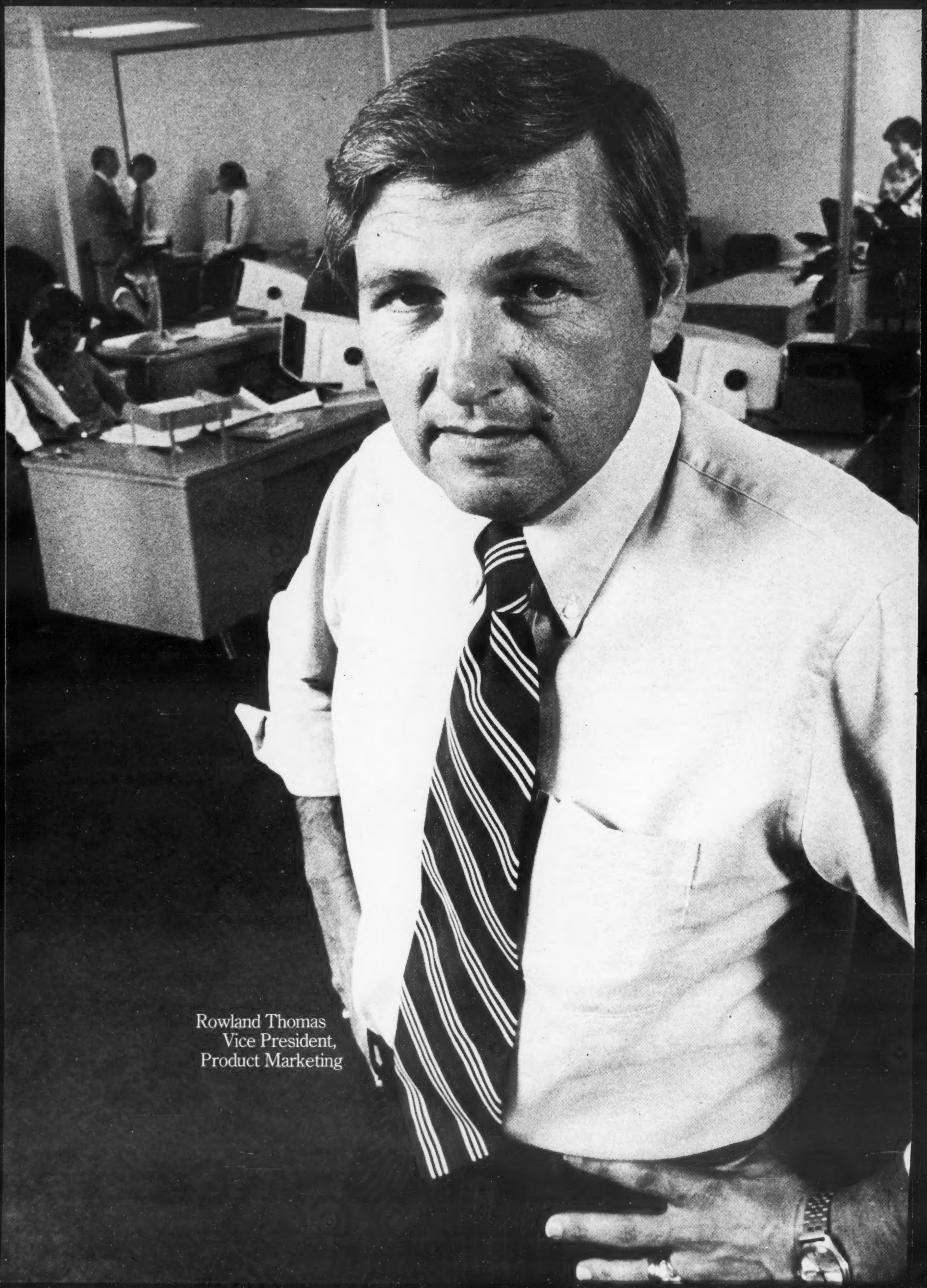

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Transborder Data Flow: Should It Be Regulated?

At a recent forum in London on transborder data flow, Jan Freese, director-general of the Swedish Data Inspection Board, and Rossiter W. Langhorne, vice-president of the Manufacturers Hanover Trust Co. with responsibility for its International Information Support Group, presented strongly conflicting views on whether the movement of personal and commercial information across national borders should be restricted. Because of the growing concern about this issue by multinationals and the U.S. government, Computerworld *asked Freese and Langhorne to present their views.*

IN DEPTH
IN DEPTH
IN DEPTH

PRO

By Jan Freese

The analogy between the rules governing international air transportation and the regulation of data flows between countries makes a great deal of sense to me. Similarly, another meaningful parallel is the comparison of time-shared data banks with their little black boxes containing all sorts of valuable information, whose activities have been controlled for centuries.

International data traffic, carrying economic products and services, should be considered for what it is — a part of the commercial relationships among nations. This is the starting point many Europeans use in approaching data flow questions, and I would hope Americans would see it in much the same way.

The term "data regulation" should not shock and anger businesspeople, nor should the legislation it often entails be a hobby-horse for lawyers and bureaucrats. There must be a demand for regulation, either by citizens or as a necessity to protect them from problems they do not realize exist.

In Sweden and many other European countries, there has been a demand for regulation — and there still is. Last year our National Bureau of Statistics conducted a survey which showed that Swedes rank privacy protection as the third most vital issue facing their lives — after inflation and unemployment — but before other kinds of social welfare programs. I believe there are many reasons to look upon privacy as a part of social welfare.

Regulations do not always have negative effects. Let me remind you of what happened when the car first appeared on British roads. Responsible persons decide one had to have a man walking with a red flag in front of this monster in order to warn people and horses. This rule was in force, I believe, for 20 to 30 years. Then it was abolished because the car could go faster than the man.

What did we get instead? Some of the most extensive and often very bureaucratic legislation.

Most of us, including those running computers at speeds faster than man ever could process information, accept society's demand for yearly car controls, rules about antipollution devices, licensing of drivers, speed limits, security equipment, limitations on vehicle size and penal codes for drunk drivers. Such legislation has become as natural to us as many other laws without which we cannot live. Traffic legislation has often been changed drastically and suddenly.

Is it not better to accept some rules now which can help us to develop computerization in a positive way, instead of that kind of legislative approach?

What is it that makes the computer so interesting and problematic? Its a tool like many others, a baby of *one* modern technology among many others. Man has acquired many new tools without making so much fuss as with computerization.

This fantastic tool is beyond comparison to anything in our history. The computer propels us into information societies in different ways than did the printing press.

Printing gave the man in the street an opportunity to learn to read and write. Computerization has instead made a lot of people "illiterate"; at the same time, society has gained privileged groups of information-rich specialists.

Computerization has a tendency to marry other technologies, such as telecommunications. That marriage has meant a revolution, an information explosion. Never before has it been possible to store such immense quantities of information; today one can even do so on other continents and retrieve and process it at home.

> Many believe the development of computerization is far from at an end. What we face today is not even the beginning of the end, perhaps not even the end of the beginning.
>
> No doubt computers have given society that rather common disease called growing pains. In many countries, those who have the political responsibility feel, as they often do, that the fast development of this technology cannot be allowed to continue without some reason, purpose and order. Many times before man has faced a new age almost without noticing it. Even if a new age developed very slowly compared with today, printing and other inventions became future shocks.

Many believe modern society cannot afford such shocks. Even if the means of coping with situations today are better than in the past, it is not easy to be sure that we are doing the right things when we try to pilot the development.

The computer itself may be neutral, but its effects on privacy and the risk of misuse, breakdowns, data trespass and other consequences change this information treasure to something else.

This discussion started with the privacy question, which already has led to legislation in several countries. These laws mean new barriers to the international flow of information. The flow has in reality not been totally free, but a balanced flow, and we have to be careful to maintain that bal-

(Continued on Page 64)

CON

By Rossiter W. Langhorne

Considerable discussion and editorializing has taken place this year about transborder data regulation, with the spotlight on individual privacy. Individual privacy is, however, only part of the issue.

One would hope that everyone would acknowledge the necessity and validity of ensuring and protecting the rights of individual privacy. In fact, we would all endorse our entitlement to privacy many times over.

Based on what has transpired in the U.S., Canada and a number of European countries to date, it seems data protection laws of varying magnitude will be enacted in many countries in the not-too-distant future. However, such legislation may well encompass much more than the protection of information related directly to individual privacy.

Although we are now witnessing the emergence of only the first generation of data protection legislation, it is not too early to perceive some of the problems posed to the private sector — problems compounded for the multinational company — by different views and different laws. The following statements are quotations from the May 1978 issue of *Transnational Data Report:*

"The proliferation of national regulations, even though these are inspired by the right motives, may, if they are not properly harmonized, have the result of inhibiting the desirable development of information. National regulations which are overscrupulous to a greater or lesser degree may, at worst, be diverted from their specific purpose and *constitute barriers to trade* . . .

"All these problems clearly call for international cooperation . . . International cooperation is the only means we have of resolving the contradiction that exists between a phenomenon which tends to take no account of boundaries on the one hand and, on the other, national sovereignty."

In discussing the basic issues, "one national figure put the job of [the Organization for Economic Cooperation and Development (OECD)] this way. It's not a question of whether the OECD, Council of Europe or European [Economic] Community [EEC] are first to prepare an agreement on cross-border flows of personal data. The real issue is whether a floor of operational principles can be placed under this activity, and soon, *otherwise national laws will become large constraints on the free flow of data.* If there is a race, it's to set down the cellar before a crazy quilt of a house is fully constructed."

Addressing IBM's position paper, in a statement by Louis Joinet against the extension of data protection legislation to cover legal persons (companies), the first argument is a *legal* one:

"Without explicit reference to the concept of 'the privacy of legal persons,' the courts take the view that there is 'a legitimate legally protected interest.' The second argument, an economic one, should be taken more seriously. There is, firstly, the fear that *skillful use of the right of access granted to legal persons will distort competition.*"

Further, an article in the June 1978 issue of *Transnational Data Report* noted that an eight-year process of preparing and exacting a Personal Data Register Act in Norway has been completed . . . Norway is the first to give legal persons (companies) rights to inspect their records maintained by banks, clients or even competitors."

In looking at the Swedish Data Inspection Board's licensing trends as they have affected the banking sector, "one major issue is the way the Data Act functions with respect to emerging special-purpose networks, as for instance the Swift interbank network. The [Data Inspection Board (DIB)] gave banks a general dispensation for transferring personal information for processing abroad in a decision of May 1974, as far as the disclosure is part of a transaction carried out on behalf of the person concerned. However, disclosure for *central* registers abroad, for instance for interbank clearing purposes, was excepted from this dispensation. This exception was applied to Swift.

"In a decision of 13 April 1976, a major bank applied for license to join the Swift network, and in its deliberations the DIB stated:

" 'The nature of the transactions and the processing in question, the limited time of storage of all transactions and the very rigorous security measure planned or announced justify the opinion that joining the Swift network will not create risks for the infringement of privacy.'

"A license to join the network was granted and later another major bank got a similar license (decision of 8 November 1976).

"A rather liberal decision relevant to banking was made 15 September 1977 in respect to an application of a major bank to process part of its files abroad. The bank was redesigning its computer system and wanted for a limited period to process deposit transactions abroad. The information included mainly information on legal persons (foreign banks), but also a small number of individuals.

"The information was transferred to a subsidi-

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IN DEPTH

(Continued from Page 62)

ance.

Computers are not an exception to regulation. Looking into other sectors of technology, one finds much legislation to protect citizens or society or, let me say, the administration of society in the interest of the citizens.

Let's face realities: we manufacture cars that can be driven faster than speed limits allow. Regulating other technologies is, however, not a reason by itself to regulate computers; legislation should not be used for unnecessary reasons and should not be used to solve problems before they occur or to cure growing pains.

At the same time, computerization will probably kill some old legislation. How soon will the UK's Prestel force us to attend the solemn funeral of copyright?

It is troubling that many of the concerns expressed about the vastly increasing transborder data communications, which are part of the Swedish, German, French, Danish and Norwegian data acts as well as in other national proposals, seem to challenge the principle of the free flow of information among countries. There doesn't seem to be anything free of charge about computerized data banks and the communications systems which collect and disperse information these days.

The technologies which are making possible the important advances in all our countries come to us at a certain cost — economic as well as social. In a way, we later receive an extra bill, charging us for the costs of dislocation and security. The negative impacts must be fully evaluated against long-standing principles.

I believe there is little disagreement over the need to preserve the free exchange of ideas and knowledge. We oppose political censorship and uphold the ideal of unhindered personal communication among all peoples.

If our discussion centered on press freedom, rules for broadcasting satellites or television and film distribution practices, it would be more closely related to the free flow principle. But setting up electronic data networks on land or via satellites comes under the trade and commerce jurisdiction of sovereign countries.

Protection of personal data which relates to human rights is but a small part of the complex economic and political questions which have emerged.

The appropriate issues to be raised, it seems to me, are those of *access* by companies to their affiliates, to clients, to processing services and to documentation and knowledge centers and the *reliability* of those links for continuous and secure operations. Reports which are appearing on tampering with microwave communications and the ease in disturbing satellite messages should make the safety of international networks one of our highest priorities.

Data protection is deeply rooted in the need for a legal regime operating reciprocally among countries or under an international agreement which ensures that personal information will be treated according to generally acceptable practices.

We should also probe the topic of access in terms of competition and an open market place for "data trade." This has basic economic characteristics; the most troublesome may be nontariff barriers which would reduce the normal growth of international communications.

The Vulnerability Issue

There is more to the access issue, however, in terms of the impact on government requirements to protect its national interest, security and integrity. In Sweden we refer to this as economic defense, which is to be protected in parallel with military defense considerations.

An expert committee with representatives from business, established by the Swedish Cabinet, has been working on the topic "The Vulnerable Computerized Swedish Society." It was not the primary purpose of the project to consider war-time dangers to computing systems, but acts of terrorism, sabotage or civil war which could jeopardize data in Sweden or anywhere in the world.

Some of the threats which were examined were:

- Risks to computing from lack of cooperation or public confidence.
- Breakdowns such as strikes and power failures which alone can slow

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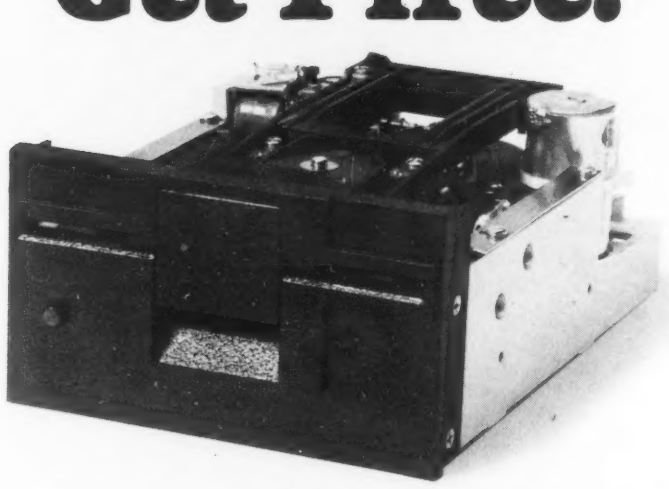

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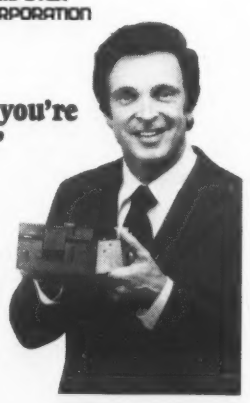

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down the entire country.

• Lack of manual routines to back up computers, because training is no longer given and paper forms are no longer printed.

• The dependence on continuous operations as a result of centralization.

A preliminary report of this committee was recently issued. The committee concluded that vulnerability is unacceptably high because of several factors: dependence on foreign sources, concentration, staff dependence and the risks associated with certain types of register content.

Emergency plans where they exist are inadequate. In regard to the causes of present computer vulnerability in Sweden, the report asserted this is because "there has been no government control over the development which has led to a highly computerized society. There has been no overall assessment of the risks entailed in the entire field of computerization . . . No such overall assessment has been made for the government service sector, even less for the country as a whole."

It should be mentioned that the Federation of Swedish Industries has officially asked for protection of legal persons in a computerized society.

The committee said the first step in counteracting vulnerability is attempting to attain a general consciousness of the problems involved. Overall guidelines for computer users from the government are necessary to come to grips with these threats.

In regard to the dependence on foreign sources, the report indicated it may be worth considering whether this can be limited, for example, by Swedish engagement in certain products which can now only be obtained from abroad. Better provision of spare parts could be achieved through agreements with suppliers; a Swedish service industry would probably contribute to limitation of vulnerability.

Addressing processing operations abroad, the committee said it is in the Swedish interest that these do not take place entirely without control.

I hope the important points made in this report will be taken into account when people outside Sweden attempt to understand our overall concerns.

The Data Act

I have heard on one hand that the Swedish Data Act is a paper tiger; on the other, that it has the power to block society. Let me make this general statement: The Data Act was designed to structure computing and the wishes of Swedish citizens in order to find acceptable points of balance.

The first piece of nationwide legislation protecting personal privacy, the act became fully effective in 1974 (I have worked with it since its inception in about 1970).

A Data Inspection Board was established to grant licenses to the keepers of personal files and to monitor compliance with the act. Anyone who wishes to set up a personal file must first obtain permission. A license is granted if there is no reason to assume that undue infringement of the registered person's privacy will arise.

The kind and quantity of personal data entered in a file, as well as the treatment of the file in the application of the data, are factors of especially great importance in weighing the risk of undue privacy infringement.

So far the board has received more than 21,000 applications pertaining to about 25,000 personal files. On an average, the name of every unmarried and conscientious Swedish adult appears in at least 100 personal files.

The number of applications and the stringent rules of the Data Act may evoke images of a vast bureaucracy, but in the space of about three years following the start-up phase, we have promulgated nearly 20,000 decisions with a small workforce.

The board has deliberately sought to avoid bureaucracy. Most decisions are routine; only perhaps 40 important decisions a year are made by the full board.

I think most of the fears of those outside Sweden have now been allayed. On a practical level, we have given everybody information from our experiences. At least everybody has been able to learn from our mistakes.

'Golden Rule of Data'

Transborder flows of personal data are specifically dealt with in the act. Section 11 states:

(Continued on Page 66)

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(Continued from Page 65)

An item of personal information included in a personal file must not be disclosed if there is reason to assume that the item may be used for data processing contrary to this act. If there is reason to assume that an item will be used for data processing abroad, it may be released only after special permission has been granted by the Data Inspectorate. Such permission may be granted only in cases where it can be assumed that the disclosure will not entail undue encroachment on privacy.

I do hope this section soon will be replaced by an international agreement.

In a real sense, this section asks for a "Golden Rule of data" — that data sent abroad will be treated the same way it is at home. We have had to deny requests for licenses to send personal data abroad when we could not feel confident of adequate reciprocity, either by the organization receiving the data or because of the absence of public law protecting the data or providing penalties for its misuse.

It has been suggested at some international meetings that it does not matter where data goes once it leaves its country of origin. But it does.

In connection with personal data, the board has learned that information was given to a foreign country and the result was abuse, out of our control, in that foreign country.

There are other kinds of experiences as well. Some multinational companies operated in Sweden by local managers are not always happy that their parent companies ask them to send on tape all information about their employees.

There is also a decision by our Supreme Administrative Court stating that there is no reason to stop information wanted by a company in another Nordic country. As far as I understand from what is said between the lines, in actual fact the information would not have been allowed to be exported to a dictatorship — or even a country from which many people have emigrated to Sweden.

I believe this is a government responsibility, and public confidence in transborder data flows is based on knowing by whom and where data is stored or processed. To put it toughly, would you buy computer services from Ugandan President Idi Amin?

Data Policy

The outlines of a Swedish data policy are now coalescing, and privacy is but one element. It's a central concern, but there are at least five interrelated parts. Including vulnerability issues, the following should be included:

- Effects of computerization on employment and the working environment.

At a Cabinet meeting in July of this year, the Minister of Labor proposed the establishment of a Commission on the Effects of Computerization on Employment and the Working Environment. It was approved and the commission will be set up shortly. Let me refer to a few paragraphs from the Minister's statement:

"In industry, computers are being increasingly used in various production processes. Automation is regarded in all industrial countries as an important means for increasing productivity.

"Computers are used for process control in, for instance, the paper, steel, cement and chemical industries. They are used for control of production lines in shipbuilding, automobile, mining and printing industries.

"Computers are also used in conjunction with numerically controlled machine tools. They are an important basic component in industrial robot systems.

"Semiconductor techniques, furthermore, have found growing applications in measuring and control equipment in industry. The quantity of small computers has rapidly increased.

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See "Data Communications Networks" in our November 27th issue.

Time was, the data communications user had a limited choice between using the public switched telephone network, or leasing private lines. But recent data communications developments are rapidly allowing the user to configure more flexible networks, with greatly increased transmission efficiency, and easy interfacing of terminals and computers to the network.

Computerworld's November 27th Special Report takes a close look at data communications networks, and how they are rapidly making distributed processing technically feasible (as well as affordable). Edited by Ron Frank, *Data Communications Networks* will examine standards for evaluating and establishing effective networks, with articles by vendors and users on design, control and maintenance of the various available networks. We'll also be talking about:

- *Terminal selection — getting the most work out of the right terminal.*
- *Private line vs. public data networks — how users can best utilize either [or both] systems.*
- *Switched networks — choosing between circuit switching, message switching, and packet switching.*
- *Configuring in the '80's — microwave transmission and satellite links.*

Whether you're presently involved with data communications, or just looking, our November 28th Special Report will be of special interest to you. And if you market data communications products or services — this is a good place to get the word out. Ad closing date is November 10, and your *Computerworld* representative can give you all the details. Or, to reserve space, call Terry Williams at (617) 965-5800.

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"Some attempts have been made at quantitative assessment of the various effects of computerization on employment. Some calculations have indicated that a loss of job opportunities was taking place in employment in the office sector, but we now find there is an increase instead.

"It is nevertheless probable that, at many places, computers have reduced the need for office staff. Unless the service sector continues to step up its total employment as rapidly as heretofore, computerization in the office sector may lead to greater problems of unemployment.

"In other sectors such as the graphics industry, parts of the communications field (posts, communications, shipping, railways) . . . the introduction of electronics has meant that certain occupational groups now seem to be disappearing. In manufacturing, industrial robots may soon replace the work of many people. The effect automation may have in the future on industrial employment is, however, little known.

"The commission will examine these developments, in particular the effects of computerization on employment, for different possible courses of future technical and economic development. It will consider the need for education and training of different occupational groups and for differing labor market policy measures.

"The commission should also analyze the various effects on the working environment that computers and automation may have. It should also consider the effects of computerization on the flow of information in business enterprises and public administration and on the employee's possibility of upholding their right of co-determination and, in that light, what measures may be needed on the part of the state to improve the working environment."

• Effects of computerization and electronics on the development of industry and commerce.

The Swedish Cabinet, also in July 1978, authorized the Minister of Industry to appoint a Commission to Investigate the Effects of Computerization and Electronics on the Development of Industry and Commerce. Here are two paragraphs describing its functions:

"The commission should first establish the extent to which industry, commerce and public administration use computers or other equipment for advanced automation. In a second phase, it should attempt to judge in what fields and in what time perspectives the use of a new technique appears to be technically possible and economically advantageous.

"The commission should consider whether and in what form measures should be taken by the government either to stimulate a greater and more effective use of this technique or to improve the means for predicting and preparing for the changes that may be necessary."

• Computers in government.

A top-level consultative group for computer questions, chaired by the Minister of Budget, was formed last year to determine the need for improved control and coordination. This may take the form of assistance in planning long-range goals when computing is introduced, encouraging decentralization, taking advantage of small computers and paying greater attention to interests of citizens affected by DP systems. This commission is due to report its conclusions in a few months.

The findings made in these areas of data policy will no doubt affect our international outlook. But by examining these issues and reaching solutions best suited to Sweden, we can act more positively at an international level.

It may appear that all of the costs and

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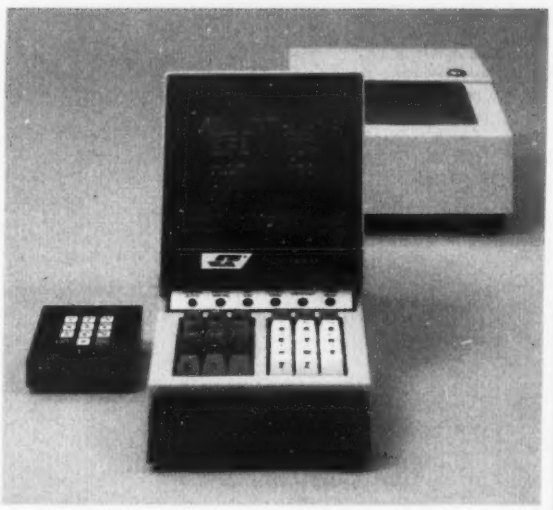

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constraints from data policies will put an unbearable burden on the businessman. This is far from true. Although there are some inital adaptation and start-up expenditures, they are intended to see that data is better protected, more reliable and always available to those who need them.

Threatening Programs

I see many of the programs we are considering as strengthening and expanding the possibilities for both sellers and users of computers and communications systems. There may be some legitimate criticism, however, in what Sweden and other countries are doing on two points.

The first is that we have begun to examine vulnerability, labor market impacts, industrial polices and coordination of government computer applications somewhat late in the game. But democratic governments often respond that way.

Secondly, those bent on the ideal of absolute free trade see some of the policies for national capabilities as protectionist. This is because few countries have sorted out the level of endogenous support they feel necessary. I predict the final result will be far less protectionist than many expect.

Minimum Rules

Overall, however, I see these reshaping efforts as opening new possibilities to computing and automation, but with more rational development geared to serve individuals and society. We are not Luddites. Yet we insist on being masters of this tool and we will not give up our national sovereignty just because technology overlooks national boundaries and traditional laws and practices.

Personally I have tried to find the smallest common denominator as a platform for transnational data flows. These rules could apply to personal and nonpersonal data alike. There are six operating principles.

Computerized information entering any country will be protected according to the following provisions:

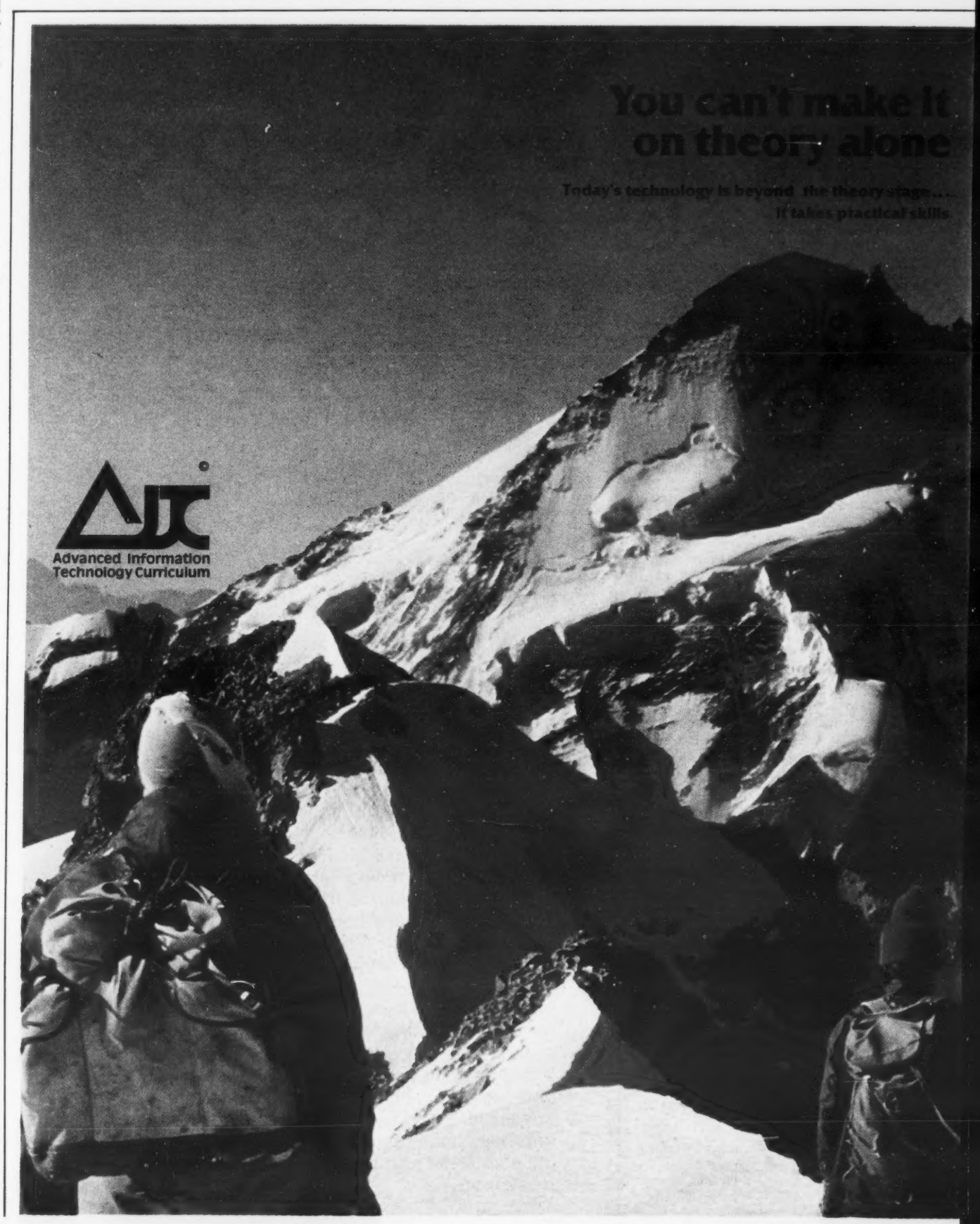
- Information shall not be divulged or used for any purpose other than the one which has been decided in its country of origin.
- Persons having legitimate access to this information shall be obliged to observe its secrecy.
- Unauthorized access to information, including its alteration, damage or destruction, shall be subject to legal penalties.
- Reasonable security measures shall protect the information.
- Reliable and continuous movement of such information shall be assured.
- In the case of personal information, individuals shall have the right of inspection, unless specifically denied by law.

I cannot find anything more international than transborder data flow. I want to keep it free and balanced, therefore I believe in my paradox that we have to regulate the free flow in order to keep it free.

International agreements have some advantages. Let's move to some agreement soon; I believe in the old Swedish proverb that "While the grass is growing, the cow will die."

Jan Freese is director-general of the Swedish Data Inspection Board. He served in 1971 as secretary of the parliamentary commission that wrote the Swedish Data Act.

Formerly a civil judge, the Swedish-born Freese has also authored several books on the impact of computers on government, business and society.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(Continued from Page 63)

ary in Luxembourg weekly by Telex and was there processed by an installation shared by the subsidiary and another bank. The output was mailed to Stockholm, and the corresponding files in Luxembourg were deleted. In its deliberations the DIB found that no risk for infringement of privacy was present and gave a three-year license to export data."

It is worth noting in regard to transborder data regulation and data protection that the privacy issue is being used by some countries not just for the protection of data pertaining to the individual, but also for purposes of broadening their legislative activities to controls of considerably greater economic scope and consequence, the rationale being that information is power.

This requires that the wider perspective of the subject be addressed from the private sector's point of view. However, before doing so I will place in perspective the international business community's role.

The purpose of private enterprise's presence in the international business community is to render service to its customers. The international business community per se — as corporate business citizens around the world — is in business to violate neither individual human rights nor host country laws. The commercial sector operates to exchange value given for value received with individuals, other business enterprises, governments and their related agencies.

In order to accomplish that objective, negotiated transactions must be completed in a timely manner. Would you not agree that everyone "wants it yesterday"? Buyer and seller alike require confirmation and essential information from time-critical operations, production, management and financial sources that is vital to the proper, timely processing and completion of each transaction.

In today's international marketplace, repetitive and timely processing of business transactions (particularly those which are time-critical) is the basis for reliable service and survival of the business community. Without the present state of data processing and communications technology, this could not be accomplished.

By necessity, this means data is processed and as required transmitted across international borders — for example, airline reservations, electronic funds transfer in support of high networth individuals, payments to relations in foreign countries and the consummation of international trade contracts.

Today's business community is global. It has extended the time-honored boundaries of individual nations' economic worlds. As such, the international business community is increasingly dependent on many forms of sophisticated technology, including computers and communications.

These technologies enable businesses to cope with the increased volumes, costs and time-critical requirements while continuing to render a quality product or service in a timely manner to the customer, regardless of location. Any legislative laws that ignore the vital necessity for the exchange and communication of information, both intra- and inter-country, ignore the prerequisites of what is required in the international marketplace.

Because of editorial sensationalism, scare tactics and opportunism related to transborder data flows and data protection regulation, it is worth taking a moment to reexamine the basic issues and concerns of the countries and private enterprises.

Identifying National Concerns

Rhetorically, it's probably worth asking the questions. Has each host country's specific concerns been quantitatively defined? Are they valid? Why all of a sudden the outcry? Is it not fair to assume that little exists today in computers, in principle, that doesn't already exist in some other form of manual file, documentation or correspondence?

Little, I would suspect, is processed by computers or transmitted across national borders electronically that today is not otherwise communicated by mail, microfilm, microfiche, the press or telephone.

Throughout Europe, selected legislative or advisory bodies have enacted or recommended legislation which ad-

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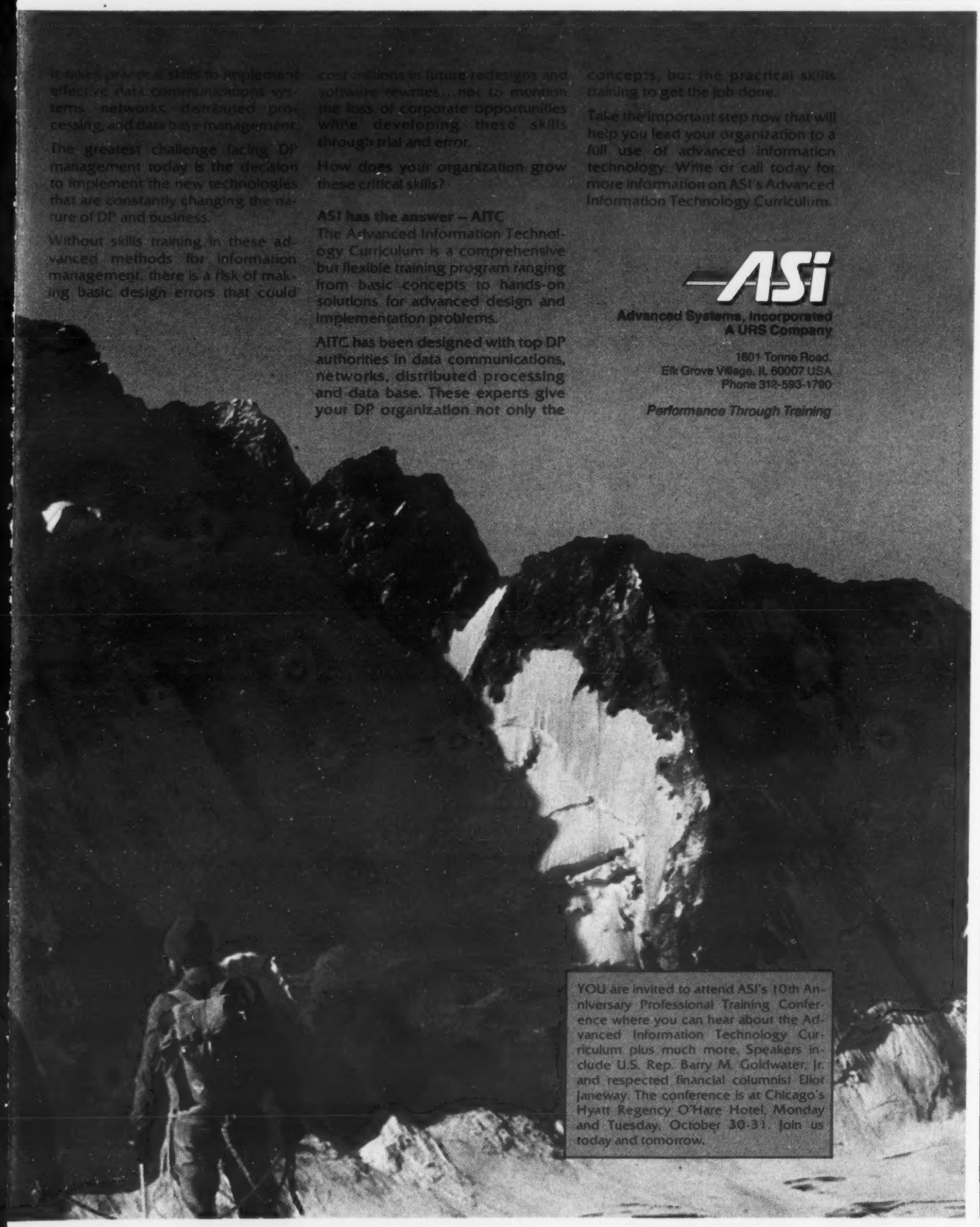
It takes special skills to implement effective data communications systems, networks, distributed processing, and data base management.
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IN DEPTH

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dresses not only individual privacy, but the broader aspects and control of transborder data flows and in some cases all data stored or processed on computers by legal persons (companies) within selected nation states.

These actions, well-intentioned as they may be, appear to have occurred without sufficient forethought to their impact on the private sector. They may be costly, counterproductive and unwarranted.

To be more specific, where imprecise problem definition occurs within the EEC, the Council of Europe, OECD or other reciprocal bodies responsible at the nation-state level, legislative controls may cause the information to be confronted with a Data Curtain.

On the subject of individual privacy, I'm sure that, in principle, private enterprise would agree with those who believe access to information stored in data bases should be permitted to those properly authorized individuals either to whom the data refers or who have a need to know. However, I would caution the legislators to reflect that at the end of the day it is essential to the business community to be able to conduct its activities on behalf of its customers in confidence, on a reasonable and cost-effective basis, in a timely manner and without unnecessary bureaucratic overcontrol, monitoring or interdiction by regulatory authorities.

What is the true issue? If problems exist and are as serious as some would have us believe, let's identify them for what they are. Is it *really* a violation of individual privacy? Is strategic national data being transmitted across international borders and processed abroad that is so vital that it poses a threat to the most advanced countries of Europe?

Or are these arguments being advanced for political reasons while masking ulterior national motives?

In trying to answer these questions, one finds that, at the national level, selected countries are inconsistent in articulating the alleged problems and how to address them. The fears of each country appear to be different. The types of data which need to be safeguarded is defined inconsistently from country to country:

- For some, it is the necessity for protection of data regarding individuals.
- For some, it is the necessity for protection of data related to national sovereignty.
- For some, it is the sensitivity of data — and "sensitivity" is a term that has yet to be defined.
- For some, it is the transmission of data beyond the host country's national borders.
- For some, as articulated in the *Transnational Data Report* of March 1978, the political concern is "that free international data circulation [makes] loss of national independence a possibility [as evidenced by] the threats posed by the Swift interbank network and American Express operations as to public carrier monopolies and to private life." Is it realistic to infer that 600 of the world's banks are intentionally or unintentionally carrying on activities which are a threat to any nation's sovereignty?
- For some, it is the disclosure of data which includes legal persons.
- For others, it is economic data, data havens and so on.

It would be a tragedy if, without quantitative precision and substantiation, the issues of individual privacy and vital national data are used to further sway legislative bodies in order to achieve additional regulatory controls which adversely impact the private sector far beyond demonstrated need.

International banking, by its very nature, must be responsible, discreet and

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precise. The business of systems and communications is one which demands precision, responsiblity and discretion. In order to solve a problem, it needs to be precisely defined.

Should the solution be less precise than the problem definition, the side effects may be unnecessary, harmful and distorted. Is there any reason why, in regard to transborder data flows, the definition of the alleged problems should be any less precise? Isn't it a moral and professional responsibility of all involved to ensure precision and reasonable solutions?

This question is particularly relevant in those countries where legal persons are being included in data protection legislation. They are Norway and Denmark to date, with possible inclusion in Belgian, Luxembourg and Austrian law.

Ulterior Motives

The content of first-generation European legislation covering data protection and transborder data flows leads one to ask: Is the real concern protection for host country industries, neutralization of foreign competition, the erosion of control and monopolistic domination of the home market and labor displacement caused by a more competitive, cost-effective technological service offered outside a given nation state? Is the intent to hold international communications users to ransom in the name of transborder data flows in order to increase domestic communications or tax revenue?

These are but two of the questions which come to mind when a multinational deals with multiple host countries' national governments, regulatory authorities and legislation on this issue.

Turning to the practical aspects of dealing with this problem, if the integration of the world's international economy is to continue, it is essential to maintain the basic freedom of both the individual and the business community to participate in the world's interdependent economic systems. This requirement becomes increasingly dependent on data processing and improved information communications at all levels of the international economic community.

If the technical channel is throttled by legislative bottlenecks, clearly the private sector will be forced into rethinking how it will accomplish time-critical business activities which rely on international communications links.

Business Input Lacking

There is concern in the private sector about the manner and content of proposals and legislation on transborder data regulation and data protection already enacted in Canada, France, Sweden, Norway, Denmark and the U.S. and currently being formulated in committees reporting to the European Parliament, Council of Europe, OECD and individual nation states. There are a number of reasons for this concern.

Legislative proposals or recommendations are being framed at two levels: first, internationally by the appointed subcommittees to the EEC or by the Council of Europe and OECD and secondly, unilaterally by the nation states.

In general, the proposals being considered by the international organizations are being prepared by advisory groups which until recently, to the best of my knowledge, provided little opportunity for substantive input and dialogue from the business community. In the OECD there is wider participation and involvement from the private sector.

At the nation-state level in selected cases, a more meaningful bidirectional dialog exists. But it is clearly insufficient vis-a-vis the problems the private sector will face as a result of the resulting patchwork legislative approach. This is particularly so because of the lack of coordination between countries.

Given this state of affairs, what will be the resultant impact on costs, trade, finance, systems development, communications and overhead personnel requirements?

Parenthetically, I would ask whether it is unreasonable for those corporate or individual members of the business community to have the opportuntiy and right to participate in proceedings which formulate data protection regulations and legislation or tariff changes which will affect the business community at large, particularly since it is on

(Continued on Page 72)

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IN DEPTH

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the international business community's financial shoulders that future legislation and its additional burdens of compliance and costs will eventually fall.

If a reasonable middle ground is not established between legislative perceptions of the problem, enforcement of present and future data protection legislation and the private business sector's requirements for a reliable flow of information, the legislative end products may well be a regulatory overkill. This will result in a lessening of business services, data transmission freedom, information communications and capability to render business services in a manner which supports host country and international clients.

At the moment, the issue has snowballed from what once was legislation covering individual privacy to a host of new categories, e.g., legal persons, data havens, national sovereignty and now value-added costs on software, on information processing and on communications. These issues are politically contentious; therefore, it would be in the interests of all that they be defused and prevented from becoming further politically polarized.

It would appear that adverse (cost) repercussions will affect the private-sector international communications user if regulatory controls cause the pricing policies of carriers, especially the European postal, telephone and telegraph (PTT) authorities, to be unilaterally escalated without a review of the potential impact on the private sector's operating costs and communications volumes. These regulations have obvious consequences:

- The potential restraint of foreign corporations' competition and trade because of increased operating expenses, decreased margins and higher prices to end users.
- Increased operational costs to foreign multinationals and host country multinationals which are high-volume data transmitter/receivers and users of DP and communications equipment as well as carriers, time-sharing services and network services.
- Deterioration of service as a result of use of alternative communications media.

It would appear that PTTs now perceive fixed-distance leased lines as a revenue-generating concept that is no longer viable and in the future will opt for volume transmitted information as a new tax/revenue base. If this is so, the business community has a clear right to know.

Before steps are taken by the PTTs to increase tariffs on information transmitted in support of financial, domestic or international trade, thought should be given to bulk rate pricing techniques, such as those in Germany, Canada and the U.S., and the elimination of widely varying communications tariffs within the EEC. Any proposals to increase tariffs or taxes on information stored, processed and transmitted would be most unwelcome by business in light of communications pricing discrepancies that already exist between the Americas, Europe, the Middle East and Asia.

Data protection legislation of one form or another has been enacted into law in the U.S., Canada, France, Germany, Denmark and Norway.

Legislation proposals or studies of varying degrees are under consideration in Austria, Belgium, Spain, The Netherlands, Finland, Australia, Ireland, Italy, Japan, New Zealand, the UK and Switzerland.

In the private sector there's no free lunch; the laws enacted thus far will have a future effect on its ability to function efficiently on a cost-effective basis.

The unilateral enactment of laws at the nation state level mandates some form of international reciprocity and standardization. Otherwise, the private sector is faced with an array of dissimilar requirements with which to comply.

Various national laws have already been enacted that contain a combination of licensing, registration and reporting requirements. Compliance means a monetary outlay that is not tax-deductible and calls for people-intensive efforts.

As regulatory compliance reporting is already a heavy burden on the private sector, it should not be escalated unnecessarily. Rather, those who are considering levying additional demands for information should be fully

(Continued on Page 74)

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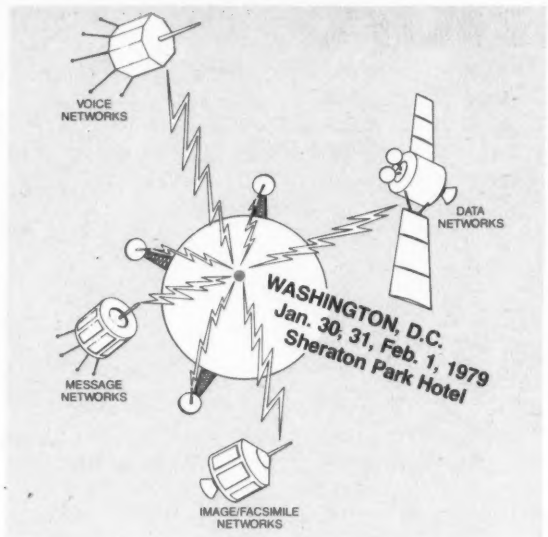

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IN DEPTH

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aware of what is already being reported, by whom, to whom and for what purpose and should consider alternative forms of obtaining, maintaining and updating the information.

There are some areas where it now appears that the first impact of data protection legislation will be felt by the private sector. Let's look at the German and French laws.

In France, the Data Processing, Files and Freedom Act enacted Jan. 6, 1978 stipulates that:

- Failure to comply carries penalties of anywhere from 2,000 to 1.6 million francs and prison terms of six months to five years.
- Companies must comply with the law within two years.
- Firms operating name-linked information processing systems must register the systems with the National Commission for Data Processing and Freedom.
- The form of declaration is comprehensive and covers the following areas: identity of register, person responsible, legal counsel for foreign-based firms, data base content, reason for system processing, name of department responsible for processing, name of department responsible for inquiries, defined limitations of operator(s), personnel with access, source of data, recipient of data, third parties to whom data may be given (auditors, for example), steps taken to ensure confidentiality of data, whether any name-linked data is to be sent out of the country and any changes in data base characteristics. The declaration goes on further to detail acceptable methods of processing which must be affirmed.
- For the banking industry, a point of particular relevance is that data on bankruptcy may not be held on file.
- The French law covers both manual and automated files.

As a point of interest and on a brighter note, the original draft legislation in France proposed inclusion of legal as well as physical persons. Legal persons have for the moment been dropped.

Turning to the Federal Republic of Germany Data Protection Act of Jan. 27, 1977, which became effective Jan. 1, 1978, there are several sections which impact the private sector and are therefore worthy of note.

The most visible requirement of the act specifies that in every private-sector establishment where at least five persons are involved in DP activities or where 20 or more people are involved with some form of tab or card systems(s), an individual will be appointed "data protection representative." His legal responsibilities include:

- Maintaining records on the type of personal data stores and purpose to which applied.
- Identifying the recipients of the processed output.
- Ensuring that software used to process personal records is used as prescribed within the act.
- Training DP personnel in the requirements of the Data Protection Act as required.
- Assisting and advising in the recruitment, selection and hiring of DP personnel.

Probably the most interesting feature of the act is its requirement that the data protection representative report directly to either the owner or managing director of the enterprise on matters regarding data protection.

The act does not prohibit the transport or communication of personal data to foreign countries provided certain contractual relationships exist and certain other prerequisites are met as specified in the act. This is obviously of more interest and concern to multinational and personnel recruiting enterprises.

The act requires that when data is stored in files, the data subject shall be so informed, have the right to request that data for review and be told to whom or what organizations the data is communicated.

A fee may be charged by the company for the provisions of such information, and provision of the above data may be withheld under certain circumstances defined by the act.

Incorrect data shall be corrected and such data may be blocked if its accuracy is disputed or cannot be proved.

There are other provisions which apply to commercial data processing by the private sector for third parties which I shall not recap here.

Penalties for premeditated violation

(Continued on Page 76)

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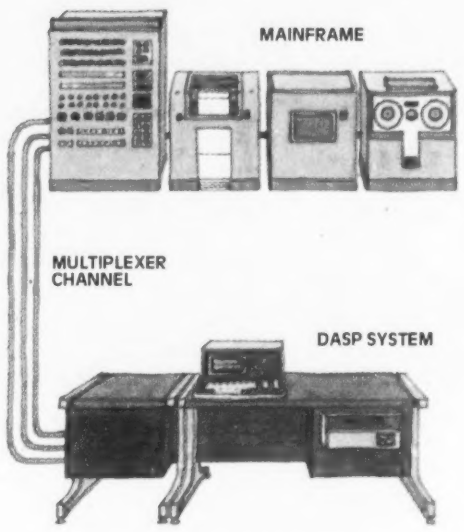

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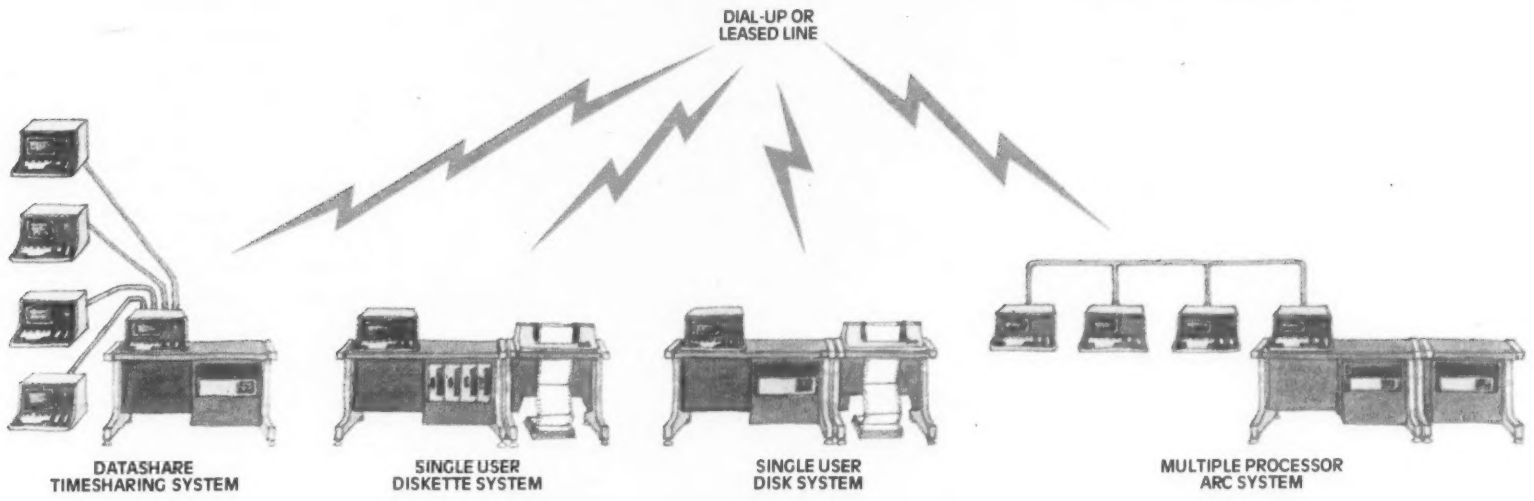

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IN DEPTH

(Continued from Page 74)

of the act range from two years' imprisonment to a fine of not more than 50,000 deutsche marks.

These are just a very few examples of the way in which data protection legislation will impact the private sector in the years ahead in only two countries. For those who have international responsibilities in this area, the implications should be clear.

Data protection legislation will impact the private sector differently in different countries where name-linked files or personal data is stored, processed or transmitted. The following aspects appear most likely to impact the private sector:

- Licensing, registration, data base description, government approval of computer applications and processing units with the associated incremental personal costs incurred.
- Notification and response to customers concerning the existence or content of data on file.
- Compliance with a host country's legislation — the appointment of data commissioners and their associated costs and withdrawal from revenue-producing service for the enterprise.
- Resolution of compliance with legislation in Country A which may be inconsistent and in violation of Country B's regulations because of a lack of harmonization.
- Inconsistent harmonization of laws resulting in patchwork compliance, requiring more knowledgeable and highly trained personnel dedicated to data production, and communications compliance activity.
- Escalated private-sector overhead costs — for administration, education, monitoring, reporting and auditing functions in support of data protection legislation — resulting in decreased gross margins.
- Imprecise definition/terminology in new data protection legislation, resulting in confusion and uncertainty in the business community's ability to comply and necessitating the involvement of a highly skilled legal staff for purposes of clarification on a country-by-country basis.
- Continued serious fragmentation of communications carriers, tariff-setting bodies, portocol groups, advisory groups, costs, standards, etc., resulting in escalated problems in international planning, information management and communications.
- Escalated uncertainty regarding ownership of data, international copyright and software protection.
- Potential application of data taxes, data barriers and legal sanctions.
- Inconsistent tariffs and negative approaches to volume-sensitive pricing, resulting in increased operating costs.
- Possible necessity for the redundancy files/data bases and the extra associated hardware and software required to maintain them.
- Possible imposition of excise taxes for the reimportation of data after foreign processing, designed to compensate for theoretical loss of revenue to domestic services.
- Increased difficulty for the commercial sector to plan, budget and implement foreign information management systems with predictable performance results, such as has been the case with the Swift interbank network because of inconsistent PTT activites.
- Uncertainty if the philosophy of free flow of information will continue; if it will not, this will have counterproductive effects on information-dependent multinationals.
- Curtailment of information transmission to only those countries with reciprocal data protection laws.
- Data protection laws which may establish additional international trade barriers to private-sector companies transferring data into or out of Europe.
- Data protection legislation may well be the first step in sanctioning state control and auditing of all information transmitted into or out of a nation state by the private sector. If data protection legislation is the next step in European moves toward protectionism the effects on the private-sector multinationals could be severe:
- U.S. time-sharing suppliers relied upon to a significant degree by U.S. multinationals may be priced out of the market by premeditated PTT tariff escalations.
- Data protection legislation may lead to an information war resulting in the protectionist Data Curtain.
- As data protection legislation in the EEC gravitates toward increased state

(Continued on Page 78)

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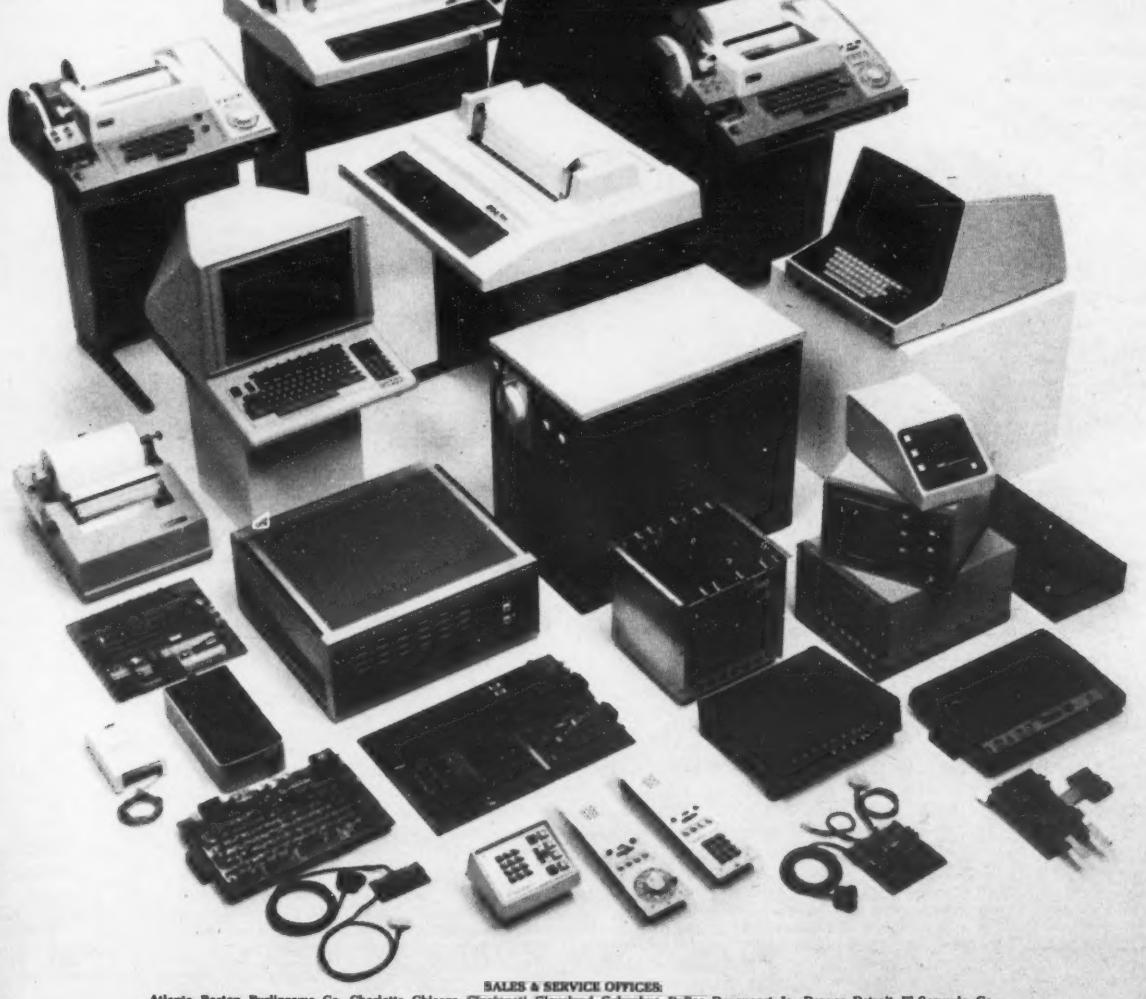

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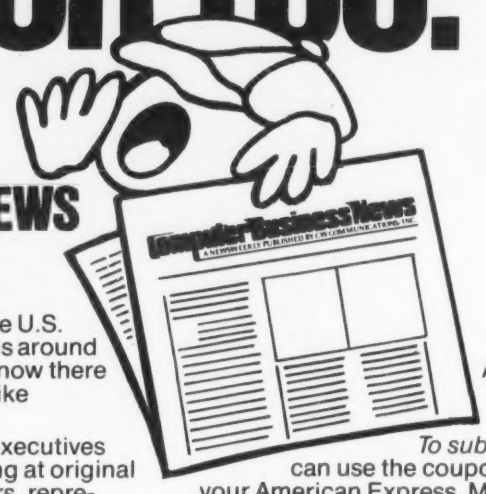

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Every week it will provide all the computer news—and nothing but computer news—in a way no other publication can match.

Computer Business News' newspaper format, high-speed printing and rapid, paid-circulation distribution system will have unique advantages for both readers and advertisers.

Computer Business News will cover all the late-breaking news of new products, the latest technical developments, changes in management and company acquisitions, national and industry economic trends, financial reports, government relations and regulations (including their impact), marketing trends, and strategies, and international news. All in one easy-to-scan, up-to-the-minute package delivered fresh each week.

This material will be researched and prepared by an experienced, professional staff, led by Editor W. David Gardner, a well-known, respected computer industry reporter and analyst. Dave will maintain editorial offices in New York and Palo Alto, to make sure of complete, late-breaking coverage of both coasts—with his main office at 420 Lexington Ave., Suite 2354, New York City, NY 10017 (212) 867-5054.

If what goes on in the computer industry is important to you, then you need the information **Computer Business News** can give you. And no other publication will give you that information as completely, efficiently and quickly.

To subscribe to **Computer Business News**, you can use the coupon below or, if you prefer, just take out your American Express, Master Charge or Visa Card and call us (toll free) at 1-800-225-3080. Whether you write or call, you will qualify for the Special Charter Subscriber rate of only $15 for a full year's subscription—52 weekly issues. This saves you $10 over regular rates, and brings the cost down to less than 30¢ an issue.

To get more information about *advertising* in **Computer Business News,** you can send in the coupon or call Roy Einreinhofer, Vice President of Marketing at (617) 965-5800. He'll show you how **Computer Business News** can be an unusually efficient vehicle to reach multiple unit buyers of computer products and services—"The OEM Marketplace"—as it has traditionally been called. You get a highly interested, paid audience, no waste circulation and a quality editorial environment.

We have a prototype issue for advertisers—including some detailed market facts on the growth of the OEM marketplace—we'd be happy to send. We also have sales representatives in Boston, New York, San Francisco and Los Angeles. Here are their names and numbers:

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IN DEPTH

(Continued from Page 76)
control, the Third World countries will follow.

• Lack of legislative harmonization will cause an inconsistent set of national standards with which the international business community will have to grapple.

The challenge of minimizing the problems and creating meaningful solutions will require major efforts. The business community must take the initiative, becoming more involved with the parties responsible to ensure that legislative actions are not proceeding without meaningful input from the commercial sector.

Heavy users of international communications wish to have the right to participate in a productive forum to contribute to resolving the issues with their host country governments, PTTs and related international agencies.

In the future, I suggest that legislation relating to information management processing, data protection, transborder data flows, pricing and tariffs should be moved into an open international forum to achieve harmonization of these issues on a country-by-country basis. Such a forum could be established by the International Chamber of Commerce, the Business-Industry Advisory Council of the EEC or the OECD.

It is essential that such a forum be created to provide the vehicle through which regulatory authorities, legislators, the business community and other interested parties achieve harmonization of legislation. Hopefully, agreement could be reached whereby nations would refrain from further unilateral action and restrain their well-intentioned efforts until discussions bring standardized solutions acceptable to both host countries and the commercial sector.

A serious commitment is needed to establish an ongoing forum composed of representatives from the business, regulatory and legislative communities and, last but certainly not least, the PTT administrations and carriers.

Problems must be defined precisely and discussed freely to understand the rationale for host country practices, thereby ensuring protection of individual privacy and tailoring solutions that do not threaten the international marketplace and the vital function it performs.

In order to place problems into perspective and resolve them equitably, the issues must be removed from the sphere of political agitation — to eliminate further polarization.

Information transmission and processing and transborder data flows are the life blood of international business — and they are essential to the international community's survival and well-being.

Rossiter W. Langhorne is vice-president of the Manufacturers Hanover Trust Co. and is based in London, where he heads the bank's international Automation Support Group. He is also responsible for worldwide communications for the International Division.

An American, Langhorne holds both a bachelor's degree in finance and an MBA in international business.

Langhorne takes full responsibility for the statements, expressions and opinions in the above piece; they do not represent the official position of the bank at this time, but a point-of-view from the banking sector.

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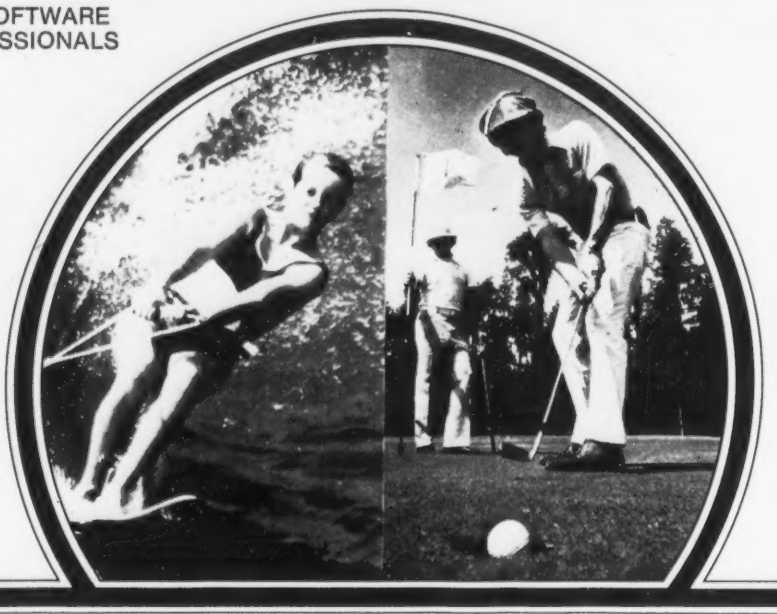

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THINK BIG aptly describes the way we develop and implement new concepts at this pace-setting NCR facility. We design and build large-scale computer systems — with a difference. Our bold thinking pushes the state-of-the-art to anticipate the EDP needs of business in the 1980s. That boldness leads to the kind of major developments that have twice warranted setting up company divisions for new products.

Where we're headed . . . We have several major projects in work. One is our new virtual resource executive — a powerful system that combines COBOL with virtual operation. Another is a system which will provide interactive transaction processing capability for our virtual mainframes. And in the design process, we're looking for new approaches to software, firmware and testware development. On top of that, we're moving rapidly into VLSI technology with the support of NCR's own microelectronics facilities.

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- **Firmware Development**
- **Diagnostic Programming**
- **Test Systems Development**
- **MICR Proof Of Deposit Software**
- **Systems Architecture**
- **Tools Support — time-sharing — compiler designs/developments (high-level block structured languages) — SW tools design**
- **Distributed Intelligence Architecture/Interactive Systems Software Architecture**
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Mr. George Rice, Manager, Professional Placement, Engineering and Manufacturing, Dept. K 50, NCR Corporation, 16550 W. Bernardo Drive, San Diego, California 92127.

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Computer Optics, Inc., a leading manufacturer of display terminal systems, is expanding its marketing force in the San Francisco and Los Angeles areas. The ideal candidate should have a minimum of three to five years experience selling computer peripherals (or mainframes) and be currently producing above average results.

Compensation package will exceed $40,000 for over-quota performance. Some management experience will be an asset, because we will be looking to promote from within.

If you feel that you are qualified and desire to be part of the dynamic terminal marketplace, please forward your resume including salary history, in confidence, to Mrs. B. Shepard, Computer Optics, Inc., Berkshire Industrial Park, Bethel, CT 06801.

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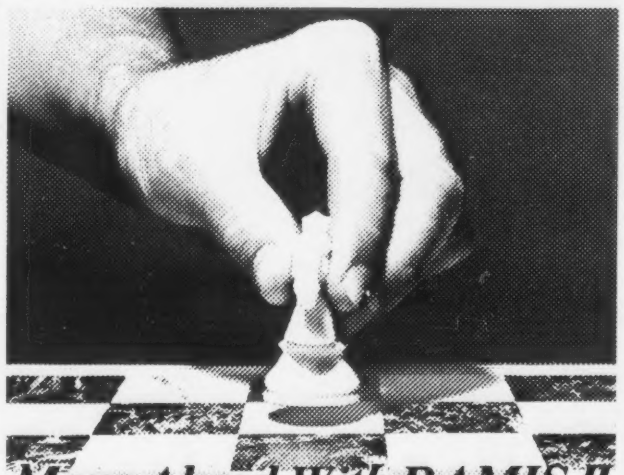

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Seeking individuals to participate in the continued development of the RAMIS II system.

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MARKETING OPERATIONS SUPPORT

Advanced degree (M.S., Ph.D.) in Operations Research, Statistics, Electrical Engineering, or equivalent work experience desired.

Algorithm Development

Responsible for the design and development of mathematical models and computational algorithms for various telecommunications marketing problems.

Market Environment Analysis

Responsible for the technical support for the company's market environment analysis, including the development of quantitative models, research methodologies and data bases.

Marketing Planning

Responsible for the technical support for the company's marketing planning function, including the development of a planning data base, resource allocation models and quantitative models in methodologies to improve the planning and tracking process. A preferred background will include an advanced technical degree or equivalent work experience in corporate planning.

Optimal Pricing

Position involves the development of marketing data for an optimal pricing project. Will also be responsible for applications of the Business Voice Market Planning System (i.e., evaluation of the economic feasibility of new generation satellite systems). Advanced technical degree or equivalent work experience in statistics and market research desirable.

Data Management

Responsible for the collection, development, and maintenance of customer data for the Business Voice Market Planning System. Advanced technical degree, or equivalent work experience, including some marketing background and a familiarity with voice products desirable.

APPLICANTS FOR THE PRECEDING POSITIONS SHOULD REPLY TO DEPT. 101.

MARKETING—FORECASTING & REGULATORY SUPPORT

Advanced degree in Statistics, Operations Research, Computer Science, Economics, or equivalent work experience desired.

Research & Analysis

Responsibilities will include performing economic and statistical research and/or analysis required to develop and apply a variety of forecasting techniques tailored to forecasting interstate messages, revenues, etc.

Systems Development

Responsibilities will include developing, implementing, and operating two manual and computerized systems. One is a complete revenue forecasting system; the other a system that will compare and reconcile outputs of existing forecasting systems for construction and planning purposes.

Systems Design

This position will assist in the design and implementation of a computerized forecasting system. It requires a technical knowledge of operations research or computer science and two to three years experience in data systems design in industry.

APPLICANTS FOR THE PRECEDING POSITIONS SHOULD REPLY TO DEPT. 102.

BUSINESS RESEARCH DEMAND ANALYSIS

Econometrics (Statistical Research Analysis, Trend Analysis, Forecasting & Rate Evaluation)

Apply state-of-the-art techniques in micro-demand modeling and forecasting to telecommunications needs in business research, service costs and rates, and marketing departments. Skills required: graduate level training in econometrics and micro-demand theory, strong background in statistics and demand modeling, excellent written and oral communications skills. Skills desired: market simulation experience, knowledge of cross elasticity studies, FORTRAN, and PL/1 programming, business experience in demand modeling and forecasting.

APPLICANTS FOR THE PRECEDING POSITIONS SHOULD REPLY TO DEPT. 103.

MARKETING SALES SUPPORT

M.S. in Operations Research or Computer Science or equivalent work experience with associated areas of study that include Optimization, Programming Systems Design, and/or Mathematics desired. Also desired, three to five years background in computer systems or operations research that includes some networking experience.

Algorithm Design

Will be responsible for the design, development, implementation, and training for specific algorithm modules within Advanced Communication System and other data network systems.

Administrative & Network Design

Will be responsible for the design, development, and implementation of specific modules within an administrative and network redesign system.

Systems Management

Will be responsible for the direct system operation and coordination of production for two marketing systems: a Switched Services Network Information System and an Automatic Message Accounting System.

Customer Profile Subsystems

Will be responsible for directing activities involved in the development of Customer Profile Subsystem and for assisting in the development of a Mechanized Collections System.

Customer Marketing Systems

Will be responsible for direct system operation and coordination of production for two marketing systems: a Customer Usage Tracking System and a Customer Oriented Market Model.

Data Network Design

Will be responsible for the design, development, implementation, and training for specific modules within data network design systems.

APPLICANTS FOR THE PRECEDING POSITIONS SHOULD REPLY TO DEPT. 104.

MARKETING—PRODUCT MANAGEMENT SUPPORT

Master's degree in Operations Research, Mathematics, Statistics, or Computer Science, or equivalent work experience desired. Background in market research or statistical consultation helpful.

Market Research/Statistical Analysis

Responsibilities include planning, executing, analyzing, and interpreting marketing projects involving market research and the statistical analysis of data.

Senior Quantitative Analyst

Position requires an advanced degree, preferably a Ph.D., or equivalent work experience in a technical area. It would also require two or more years experience in industry or education applying quantitative techniques, plus one to two years experience supervising a quantitative marketing team.

APPLICANTS FOR THE PRECEDING POSITIONS SHOULD REPLY TO DEPT. 105.

MARKETING SYSTEM SUPPORT

Requires Master's degree in Computer Science or, most important, work experience relating directly to the job, i.e., experience in a specific type of software.

Software Development

Responsibilities will include the demonstration of software development and maintenance under the RSX-11M or UNIX operating system of the DEC PDP minicomputer. These systems will be generalized for industry oriented use in the Long Lines National Demonstration Center. Will also act as the developer of tailored demonstration software packages.

Data Base Management Systems Programming

Responsibilities will include overall administration of the use of National Sales Center. The position will also oversee all software and hardware requirements for the center, acting in a technical consulting capacity to product and market management groups. Strong background in systems programming, specifically DEC PDP minicomputer required.

Customer System Support

Responsibilities will include coordinating all customer support activities for all Bell Modems, Low Speed Teletypewriter Terminals, and minicomputer systems that include the DEC PDP-11, data general NOVA, and similar systems.

Systems Programming Software

Background should include heavy experience in systems programming on IBM equipment and in various programming languages. A knowledge of several operating systems, access methods, and data base management systems is required.

Systems Programming Hardware/Software

Background should include experience in mainframes (particularly IBM), front-end processors, access methods, data base management, time-sharing, application programming, protocols, line monitoring, terminals, and networks.

APPLICANTS FOR THE PRECEDING POSITIONS SHOULD REPLY TO DEPT. 106.

PRODUCT MARKETING

Data Systems Sales

Responsible for providing expert advice and guidance to Sales/Marketing personnel on the selling of advanced data systems. Background must include 3-5 years experience in data equipment sales.

APPLICANTS FOR THE PRECEDING POSITION SHOULD REPLY TO DEPT. 107.

DATA SERVICES

B.S. or M.S. degree in Computer Sciences, Mathematics, or other related technical areas required. Two to five years direct programming experience desired.

IMS Systems Software Support

Responsible for the evaluation and implementation of new versions of IMS and maintenance of current versions of IMS. Background should include software design and development using IMS in COBOL, Assembler, or PL/1, and debugging.

MVS Resource Management Software Support

Responsible for support of software packages used in the operation and management of CPU's running MVS. Background should include software design and development in COBOL, Assembler, or PL/1, and debugging.

Minicomputer Software Technical Support

Background should include mini/micro computer programming, mini-ASM, mini-BASIC, minicomputer systems and subsystem design, and telecommunications design experience.

Enhanced Product Application

Background should include experience in structured programming and design techniques, COBOL, OS/VS S370 computer environment and JCL, standard access methods, time sharing for development and testing, and testing and debugging techniques.

Scientific/Experimental Software Modeling

Background should include programming experience with FORTRAN or PL/1, JCL, debugging techniques, structured programming techniques, and time sharing.

APPLICANTS FOR THE PRECEDING POSITIONS SHOULD REPLY TO DEPT. 108.

SERVICE COSTS & RATES

Microeconomics

Responsible for assisting in the development and application of economic pricing theories. This will involve applying mathematical techniques and economic principles to business problems. Econometric estimation of demand and production/ cost function will also be required. Preferred background will include graduate degree in economics/econometrics or equivalent work experience.

Mechanized Information Systems

Responsible for the detailed definition and design of new or improved mechanized information systems and the maintenance of existing ones. May also be called on to retrieve data using RAMIS, GIS/VS, or MARK IV. Background should include experience in systems and subsystems design, conversion design, and systems testing.

APPLICANTS FOR THE PRECEDING POSITIONS SHOULD REPLY TO DEPT. 109.

ENGINEERING

Digital Information Micro Electronics

Responsible for work in the field of digital information transmission, including carrier, radio, and time division switched systems. Projects will involve field measurements of existing equipment and designing new equipment as needed. Preferred background should include a B.S. or M.S. degree in Electrical Engineering or Physics, and two to five years of relevant work experience.

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Responsible for the design and development of software for a real-time minicomputer environment. Background should include three years experience in software design and a B.S.E.E., M.S.E.E., or a degree in other technical areas.

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Responsible for data transmission, multiplex equipment and transmission circuit design. Must have experience in all of the above areas.

APPLICANTS FOR THE PRECEDING POSITIONS SHOULD REPLY TO DEPT. 110.

CORPORATE COMMUNICATIONS

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Responsible for writing and editing in connection with employee publications and news relations. Requires reporting, editing and layout of publications under strict deadlines. Candidate must have a solid journalism background, preferably at least three years experience on a metropolitan daily and/or wire service. Journalism degree preferred, but not essential. Professional journalism experience a must.

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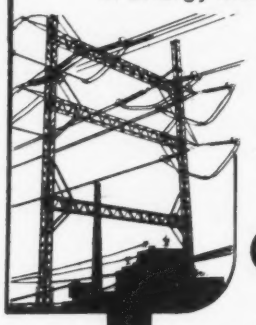

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CTCI

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amdahl

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Please send applications to
Gary L. Buterbaugh, Chairman,
Computer Science Department
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Indiana, PA 15705
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Please send resume and salary requirements to:

Personnel Depart.
AMCA International Corp.
5775 Summer Trees Dr.
Memphis, TN 38134

MGR.-SYSTEMS DATA PROCESSING

Evansville, Ind. Location
Distribution Industry

Major "Fortune 500" Corporation has immediate opening for experienced Systems Manager, degreed, knowledgeable in Cobol and R.P.G. You should be proficient with remote data entry, and have some background in accounting and inventory control systems. You must have a minimum of 5 years indepth experience. Distribution industry experience a valuable plus.

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Sperry Univac, a leader and principal innovator in data processing, is seeking experienced Systems Analysts to join an expanding, creative vendor environment, for positions in Corpus Christi and Austin, Texas. Corpus Christi and Austin offer an alternative to the "big city", yet they retain the attractive aspects of a metropolitan area. Each city is distinct, but both offer excellent climate, a scenic geographical location in which to enjoy a variety of outdoor activities year-round, plus relative low cost of living.

We are seeking experienced Systems Analysts with one to three years experience in VS-9. Assembler, RPG, and COBOL experience would be an asset. Series 70 experience would be compatible.

If you are interested in a challenging position, possess a degree or the equivalent experience, in addition to the above qualifications, please call COLLECT or submit your resume to: **Pete Gunnoe, Sperry Univac, 220 Foremost Road, Austin, Texas 78745, (512) 282-3200.**

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Heavy COBOL or assembler language

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software engineers

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These positions require an individual whose primary interest is in the creation of tools used by other software engineers involved in both the development and manufacture of turn-key control system software. Successful candidates will participate in the complete software development cycle from initial definition of user requirements to fully operational software tools. This is a significant opportunity for highly motivated professionals to apply their creative ideas in a unique software development environment.

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measurex CORPORATION

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ADR's diverse product line is state-of-the-art. Our systems range from on-line programming systems to language translators; from text processing to performance measurement. IBM technological advances are usually heralded by new ADR products. ADR software products are rated #1 in the 1977 Datapro survey — surpassing every other company in the number of products (4) honored by Datapro.

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Please send your resume in complete confidence, including current salary and position desired, to: Director, Software Products Division. Or call 609-921-8550.

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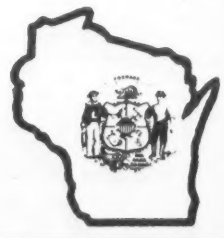

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ATLANTA, GA 30346 — R. Spang, 47 Perimeter Center, 404/393-0933
BALTIMORE, MD 21204 — R. Nelson, 409 Washington Ave., 301/296-4500
CHARLOTTE, NC 28202 — J. Schwab, 1742 Southern Nat'l Ctr., 704/375-0600
CLEVELAND, OH 44131 — A. Thomas, 5755 Granger Rd., 216/749-6030
FORT LEE, NJ 07024 — R. Mansfield, 2125 Center Avenue, 201/947-6920
McLEAN, VA 22101 — D. Miller, 7921 Jones Branch Drive, 703/790-1335
NEW YORK, NY 10036 — W. McNichols, 1211 Ave. of the Americas, 212/840-6930
PITTSBURGH, PA 15222 — J. Beck, 4 Gateway Center, 412/232-0410
PRINCETON, NJ 08540 — R. Davis, 3490 U.S. Rte. 1, 609/452-8135
WILMINGTON, DE 19810 — L. Benson, 3411 Silverside Rd., 302/478-5150
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Will assume full responsibility for MIS planning and SDM/70 implementation. Incumbent will directly assist divisional manufacturing personnel in MIS planning; establish policies and procedures for systems planning and coordinate the development and integration of long range systems plans. 25% travel. A 10 year background in hardware/software systems, large-scale project management experience, a thorough understanding of systems development methodology, and management experience required.

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Will assume full administrative and budgeting responsibility for the corporate MIS function. Solid background in systems coupled with 5-7 years financial analysis/administrative experience in MIS that includes an indepth knowledge of budgeting and ROI/ROA essential.

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We need qualified people to assist in the design and development of new data base software packages.

Qualifications and experience desired:

- Teleprocessing applications or development experience
- 360/370 Assembler language
- Internals knowledge of at least one: DOS/VS, VSI, VM, MVS
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- BTAM-BSC or SDLC experience desirable

If you qualify and desire to join a progressive company with state of the art expertise, we would like to talk with you. Send your resume in confidence to:

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Mr. Charles Ballard,
Personnel Department

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Please forward resume and salary requirements to Affiliated Banks Service Company, 8461 Delaware, Denver, Colorado 80221

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Send resume to
Mr. Jerry Simotas,
Computing Center,
Iona College,
New Rochelle,
N.Y. 10801.

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Due to rapid expansion of our Field Maintenance Services, we have openings in our Field Maintenance Group for qualified Field Engineers trained on IBM 360/370 Computer Systems or their associated OEM Peripherals.

We offer competitive salaries, and an attractive Benefit Program.

Interested applicants should send resume in strictest confidence to Mr. M. Faber, or Call (312) 884-2424.

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If you're a minicomputer software professional looking for more involvement and reward, make the right move....to Honeywell.

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We're seeking talented professionals who will take full advantage of the wide-ranging involvement we offer and who have the communications skills necessary to work with others. Take a look at the following openings, and see if the right move for you could be to Honeywell.

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Exciting positions for senior systems analysts who can assume full project and design responsibility at state-of-art levels. You'll be involved in structured network architecture and the design of congruent products that can fully exploit that architecture. Other responsibilities could include special purpose real-time and OEM systems, business and transaction processing systems and special challenges in modularity and applications mobility across executive environments. Minimum of 4 years experience (ideally in communications/networking) is required.

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These positions involve maintaining and extending multi-terminal word processing applications on multi-function minicomputer operating systems. 1-3 years assembly language experience in communications (especially networking) would be appropriate qualifications.

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We need dynamic individuals with 2-4 years communications programming experience and, ideally, a solid background in either IBM communications software or a major vendor's distributed network architecture. This is a unique opportunity for high-level visibility and a reasonable amount of domestic and international travel in resolving complex customer software problems.

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You'll be involved in the analysis, design and development of CNC/DNC and post-processor systems for computer-aided manufacturing processes and test equipment. You should have 2-4 years experience in systems design/programming on minicomputers and have some prior exposure within a N/C manufacturing environment.

Sound Interesting? If so, make the move ...forward your resume, including area of interest and salary requirements to Mr. L.J. Doherty, HONEYWELL S/MISD, MS-804, BM-002, 300 Concord Road, Billerica, MA 01821.

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Experience with a computer manufacturer in software systems design and development plus M.S. in Computer Science or equivalent. Knowledge of design integrity, quality control and project management functions of the software development process.

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Systems software development. Requires a B.S., preferably an M.S., in Computer Science, Math or Engineering with systems programming and/or microprocessor experience.

Please send resume and salary history in strict confidence and/or call: Toll free (800) 327-4989.

Mr. Robert Coyner
Manager Professional Staffing
Harris Computer Systems Division
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The School District of Oconee County has an opening for a Computer Assisted Math Program Coordinator, effective immediately. Master's degree desirable; experience of successful human relations skills; experience and/or training in Computer Science; experience and/or training in math and math education desirable.

Contact the Dir. of Personnel
School District of Oconee County
P.O. Box 220
Walhalla, SC 29691
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Needed, three to five instructors, expert in at least one of the following languages: COBOL, ALC, RPG II and able to teach at least two of these. Strong committment to professionalism. At least two years programming experience. Salary commensurate with technical ability.

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Management Development, Cubic Corporation
9233 Balboa Ave., San Diego, CA 92123 (714) 277-6780
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Expansion of our Management Systems operations has created career opportunities in the design, installation and maintenance of operating systems, application software packages and associated software for large computer systems operating under IBM 370 and CDC-175. We have immediate openings for Software Systems Specialists. Selected candidates will implement and assist in the coordination of major software installations in the areas of MVS/JES 3, CICS/VS, IMS or Telecommunications.

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We offer qualified candidates an excellent compensation program including relocation and definite opportunities for continuous career growth within our advanced state-of-the-art environment. For prompt consideration, forward detailed resume in strict confidence to:

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An Equal Opportunity Employer M/F/H

SOHIO

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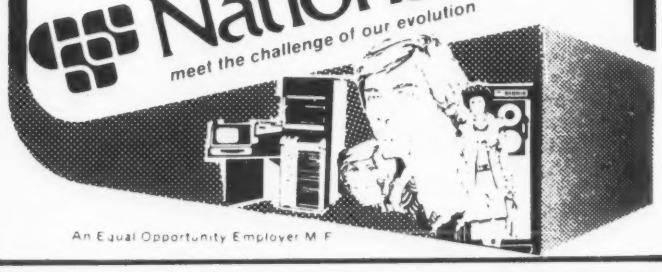

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COMPUTERWORLD

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TAMPA, FLORIDA 33607
813-872-1853

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Mr. C. Watson
Director of Personnel
Time Sharing Resources
777 Northern Blvd.
Great Neck, NY 11022
Equal Opportunity Employer

SYSTEMS PROGRAMMER STAFF ASSISTANT UNIVERSITY OF MASS./AMHERST

Position available December 18, 1978. Previous experience with and utilization of an administrative or business computer system. Minimum one year experience as a system programmer in an OS/VS or MVS environment. CICS knowledge/experience desirable. Prefer knowledge of and/or experience with a Data Base management system. Bachelor's degree or equivalent professional experience required. Salary commensurate with qualification and experience. Resume by November 20, 1978 to:

DATA PROCESSING CENTER
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EDP SPECIALISTS

Nationwide

Sr Consit Big 8 NYC location.	To $30K
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(212) 661-0670 (agency)

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Positions available nationwide at regional offices and in our home office for experienced professionals who can:

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Board of Governors
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Located in west suburban Chicago, the Cooperative Computer Center (CCC) serves the administrative data processing needs of three Board of Governors institutions: Chicago State University, Governors State University and Northeastern Illinois University. Resources include a staff of 60, production software developed by SCT Corp. and an ITEL AS/4 computer supporting several RJE stations in an OS/VSI environment.

Reporting to a council of the three university presidents, chaired by the governing board's Executive Director, the CCC Executive Director is responsible for optimizing the performance of present resources, developing long-range ADP plans, preparing operating budgets, recruiting staff, allocating resources, project management, and ensuring that the universities receive timely and accurate management information.

Minimum academic qualification is a bachelors degree; an advanced degree in Computer Science or a related field is preferred. In addition, candidates should possess significant technical and administrative experience related to the management of an administrative computer center. Such experience should include a successful record of planning, budgeting, policy development, coordination and technical leadership for cost-effective university information systems. Candidates must be able to establish effective working relationships both with senior executives and technical personnel, and be sensitive to the varying information needs and political considerations within a university cooperative.

Starting annual salary is highly competitive with executive salaries in higher education and is negotiable, depending upon experience. Applications must be received by November 17, 1978.

Send resume, references and salary history to:
Dr. Donald E. Walters
Chairman, CCC Director Search Committee
c/o IEC
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RSVP SERVICES
Employment Agency for Computer Professionals

DIRECTOR SYSTEMS SOFTWARE DEVELOPMENT

Data General Corporation, a major and internationally known computer manufacturer, seeks a Director of Advanced Systems Software for new product line development.

The Director of Advanced Systems Software will assume full responsibility for managing the development of advanced software products including operating systems, languages, and DBMS; manage high technology, development-oriented organization, coordinate software activities with applicable hardware projects, develop and maintain product plans, objectives and schedules.

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Interested applicants should call J.E. Jensen collect at (919) 549-8421, or send resume, in confidence, to him at Data General Corp., 62 TW Alexander Drive, Research Triangle Park, North Carolina 27709.

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- **Systems software developers** with data management, report generation, and inquiry experience.
  Locations: New York and Milan, Italy.
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- **PASCAL**
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SYSTEMS PROGRAMMER

Responsible for operating system generation and maintenance on an IBM 370/138 OS/VS and several PDP 11/70's with RSTS/E. Must have strong background in IBM system maintenance, JCL, COBOL, assembler language, debugging, BTAM. Experience with RSTS/E data base management, telecommunications, and software package installation in maintenance a plus.

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With National CSS, you will enjoy excellent salaries, liberal company benefits and ongoing opportunities for career growth. You will have the opportunity to experience a broad range of development projects while working with the most advanced computer system in the industry. For immediate consideration please forward your resume with salary history (only those resumes which include salary history will be considered) Richard Brittain, Corporate Recruiter, Box A, National CSS, Inc., 542 Westport Ave., Norwalk, Connecticut 06851

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An EOE M/F.

SYSTEMS PROGRAMMERS (4)

2-5 years systems experience; familiar with operating system concepts, assembly language expertise; communications and transaction processing a plus. Preference to Data General Commercial Eclipse-ROOS/AOS and Honeywell Level 6. Send resume to:

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Manager, Employment

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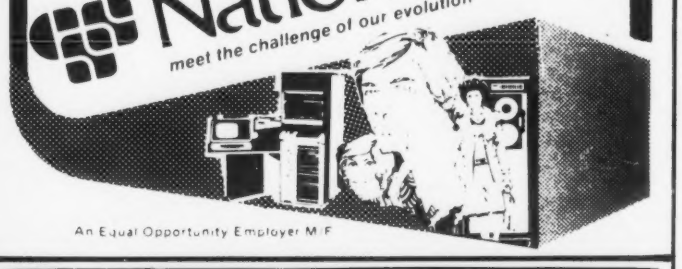

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(408) 249-9353

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- familiarity with environmental conditions, facilities and management controls which result in effective office functions;
- knowledge of latest developments in mini-computer and word processing technology desirable.

Send resume including salary history in confidence to

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We are the nation's leading provider of computerized billing for the cable television industry. Expanding product requirements have created an immediate opening in our Software Development Division for a person to handle Assembly Language programming on our Honeywell Series 2000 computers.

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This is a definite career position offering a salary which will fully reflect your qualifications and an excellent benefit program fully paid by company. Send resume and salary history to **D.E. Barnes, 3200 Arden Way, Sacramento, CA 95825.**

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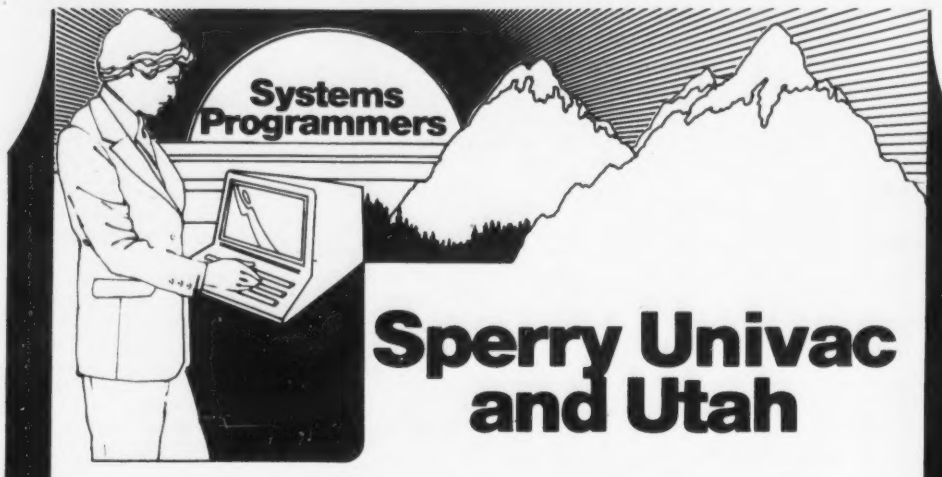

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Data Processing

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If you have four or more years experience with IBM Products 370-OS/VSI, BTAM, CICS, Data base and COBOL/Assembler Technical support we would like to meet you. You'll interface with operations and applications development personnel and have responsibility for the implementation and support of exciting vendor products in a 500 Million Dollar Company.

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The representative will support users of our Time Sharing and Batch computer services on IBM, DEC, Honeywell, CDC, and Amdahl equipment, and to this end, must be a versatile, high achiever with a solid base of programming/ systems experience.

In this position, which will entail a large amount of sales oriented customer contact, the representative must be able to deal effectively with highly technical problems at a detail level, and perform effectively in new and challenging situations.

If you believe you meet our requirements, won't you please send your resume in confidence to:

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Requires BS Engineering or Physical Sciences (MBA desirable). Must be knowledgeable in mainframe information systems, data communications, minicomputers, and data entry techniques. Voice data entry experience desirable.

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TOUCHETTE needs qualified Systems Programmer with a minimum of three years' experience in DOS/VS, POWER VS systems generation. Responsbilities would include Sys Gen, Software Evaluation and Planning, and Technical Support.

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Mr. Daniel J. Healy
The Touchette Corporation
5701 Enterprise Parkway
East Syracuse, NY 13057
Telephone: (315) 445-0291

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P.O. Box 6778
Cleveland, Ohio 44101
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SYSTEMS ANALYST Understanding of BAL, DL/1, CICS, and commercial applications. Minimum 7 years' experience.

JUNIOR SYSTEMS ANALYST Work under the direction of the Systems Analyst. Assist the Systems Group in job tasks and learn to meet system standards. At least 1-3 years' related experience.

SENIOR PROGRAMMERS Strong background in assembler language required. Knowledge of DL/1 and CICS a major plus. At least 5 years' programming experience required.

PROGRAMMER ANALYSTS Must be heavy in assembler language. Understanding of DL/1 and CICS desirable. At least 5 years' programming and systems analysis experience.

Qualified? Then don't delay! Excellent starting salaries, profit sharing, full benefits, outstanding career opportunities. Convenient location. Please send resume with salary history, in complete confidence, to:

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EDP SPECIALISTS

DATA PROCESSING MANAGER

Rapidly growing multi-plant manufacturer on AMEX located in Northern suburbs of Philadelphia is seeking a Corporate EDP Manager.

This challenging position requires a minimum of 2 years management experience and at least 10 years overall experience in EDP. A degree and a minimum of 2 years COBOL programming are also required. Manufacturing systems background along with remote processing and data base management experience will be helpful.

As successful candidate, you will be responsible for installing a new computer, staffing, managing the conversion of existing systems, developing on line manufacturing and management information systems, and all computer operations.

You will be an important part of the Corporate management team. This position will utilize your technical skills and enable you to apply your management expertise.

Excellent salary, benefits, and working conditions.

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We have an excellent starting salary for those with demonstrated expertise, regular increases are based on individual merit. Our benefit package is second to none, and relocation costs are provided. If you think that individual effort is important, and want to work for a company that agrees with you, call or send your resume to Mr. Ed Lyons.

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If you meet the above requirements and seek a challenging opportunity, excellent salary, and benefit package, please send resume including salary history to Ms. J. Rogers:

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Our Data Processing facility, located in Tehran, Iran, is among the largest in the Middle East. The hardware is Dual Honeywell 6060. The software is GCOS, COBOL, GRTS, GMAP and TSS. Applicants include Maintenance/Material Management and Personnel/Payroll as part of our Integrated Logistics Management Systems.

Experience on our systems is preferred, however we would be interested in evaluating your credentials if you have a strong background in the manufacturing environment.

Other openings include:

SOFTWARE ANALYSTS - Prior background in Honeywell software support. Requires thorough knowledge of GCOS, GMAP and GRTS.

TELEPROCESSING SPECIALISTS - Requires two years in teleprocessing activities utilizing H316-716 hardware with general knowledge of GCOS and working knowledge of TDS, GRTS, TSS and NPS.

DATA BASE ANALYSTS - Should possess one to three years experience in Data Base maintenance programming utilizing IDS. Applicants with strong experience in IMS or DMS may be considered.

In addition to paying your transportation and relocation expenses, Bell Helicopter will provide you with a highly-competitive income and a generous benefits package which includes a housing supplement, travel and cost-of-living allowances, and overseas bonuses.

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CAREER OPEN HOUSE IN CHICAGO

Wednesday, November 15 & Thursday, November 16, 1978

While you're attending COMPSAC '78, why not attend our Career Open House at the same time. Ms. Susie Schonberger, Professional Staffing Representative, Mr. Robert Poston and Ms. Sally Richmond, Technical Operations Managers, can tell you about the many career opportunities available with the System Sciences Division of Computer Sciences Corporation.

CSC's System Sciences Division is supporting challenging projects for the FAA Air Traffic Control Simulation Support Program and the Enroute System in Atlantic City, New Jersey, the Mission Support, Science and Applications, and Goddard Real-Time Systems Projects with the NASA Goddard Space Flight Center in the Maryland Suburbs of Washington, D.C. Your degree in Computer Science, Mathematics, Physics, Astronomy, or Engineering and a background on large-scale computers and/or mini-computers would be most welcome.

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- **IBM 360/OS System Generation and Maintenance**
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To schedule an interview in advance, call us on our Toll Free Number – 800-638-0842. Otherwise, join our Technical and Administrative Staff in Chicago on Wednesday, November 15 from 11:00 AM to 7:00 PM and Thursday, November 16 from 10:00 AM to 4:00 PM. Ask for Ms. Schonberger at the Palmer House and stop by. We'll be happy to meet with you.

CSC offers competitive salaries and a comprehensive benefits package including a liberal relocation policy. If you're unable to see us in person at COMPSAC '78, please send resume or call:

Staffing Department
Toll Free: 800-638-0842 OR Call Collect: (301) 589-1545

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SUPERVISOR OF TECHNICAL SYSTEMS

Atlanta, Georgia Area

IBM/370-168, MVS, JES 2, TSO

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A solid knowledge of MVS internals, JES 2, TSO, and MVS tuning and performance is essential. Data Base and Data Communications experience is also required.

This is an excellent opportunity to join our progressive management group and benefit from a generous employment package. If you have the qualifications we seek, send your confidential resume to:

Manager Data Services
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LITHONIA LIGHTING

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Reed College seeks a skilled programmer with a firm understanding of computational techniques in natural and/or social sciences (including simulation, data analysis, and graphics), to join member of the faculty in a 3-year cross-disciplinary project to extend instructional uses of computers. The position is available immediately. Applications, including transcripts and letters of recommendation, may be sent to Prof. William Weir, at Reed College, Portland, OR 97202, an Equal-Opportunity/Affirmative-Action employer.

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$34,656 to $38, 232 (salary negotiable)

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Director of Logistics

A major West Coast computer manufacturer need to recruit an experienced manager to become Director of Logistics.

This position includes all line management activities associated with worldwide control and distribution of spare parts and also refurbishment programs for spares and used equipment. As the major part of the job is the control and distribution of spares, the successful applicant must have a strong understanding of sophisticated inventory techniques and have line management experience of running a spares organization for a computer or electronics company. Recent experience in developing and implementing computerized spares distribution and programs would be a strong advantage.

We offer excellent benefits and competitive salaries. Please forward resume including salary requirements to,

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Data Processing

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Need 2-5 years programming experience, COBOL or ALC, to develop and maintain oil & gas and financial application programs. Position requires excellent programming skills with forward potential in Systems Analysis and Design.

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Need 3-5 years systems programming experience, primarily in OS Systems. Prior DOS to OS conversion experience is a plus. Responsibilities include SYSGEN, Software Planning, Performance Measurement, Technical Support and ALC coding.

We offer an excellent salary and benefits package. For immediate consideration, please direct resume, including salary history to:

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Princeton, N.J.

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Project Manager — 5 to 7 years experience in design, implementation and management of major systems. Broad background in data processing and mini-computer architecture. Working experience and knowledge of Criminal Justice System at management level. To 35K.

Systems Manager — 4 to 5 years experience in data processing systems design and software development for large and mini-computer systems. Will be involved in writing RFPs for hardware procurement. Knowledge of Criminal Justice System. To 25K.

Management Analyst — 4 to 5 years experience in project support. Must have worked on and supervised the development of procedures manuals, time studies, paper flow projects and forms. Knowledge of Criminal Justice System. To 25K.

Send resume with salary requirement in confidence to:
Mr. William E. Bennett
Div. of Criminal Justice
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Princeton, N.J. 08540
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San Francisco, CA 94105
415/546-7200

525 University Avenue
Palo Alto, CA 94301
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Federal Credit Union
777 Juneau Street
Anchorage, Alaska 99501
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UNITED AIRLINES

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Requires strong technical knowledge and good managerial and leadership skills. Position will be fully responsible for design, implementation and maintenance of applications system in the major user area. Project management positions are available in the Flight Operations and Materials Control group. Must have at least six years experience, including IMS and COBOL.

SR. PROGRAMMER/ANALYST

Will participate in various levels of analysis, design, development and implementation of on-line IMS systems to support our Flight Operations and Maintenance and Engineering areas. Requires 5-9 years data processing experience. Working knowledge of IMS and COBOL required. ALC and on-line experience helpful.

PROGRAMMER/ANALYST

Requirements include a BS degree or equivalent experience as an analyst, a minimum of three years data processing experience in all aspects of COBOL programming. IMS experience is a must. Responsibilities will include application software development in an IMS Data Base environment, including program design, coding, testing and implementation.

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Radio Shack Computer Centers
A Division of Tandy Corporation
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Fort Worth, Texas 76102

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NCR San Diego launches major new corporate data base programs.

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For complete information, call collect (714) 485-3356 and ask for Mr. Walt Kleffel, or send your resume and salary history, in complete confidence, to him at NCR Corporation, Systems Engineering, Department 5120, 16550 West Bernardo Drive, San Diego, California 92127.

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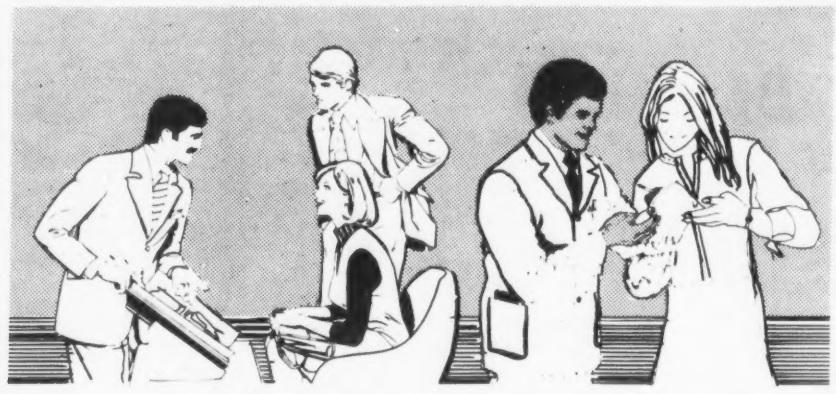

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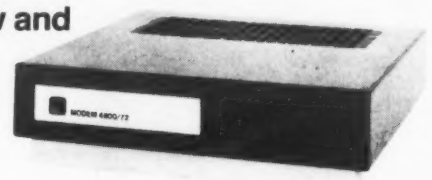

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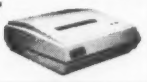
Printer 	**BRAND NEW 40 + 10 PRINTER** Desk top printer. Produces 80 columns of 5 x 7 dot matrix character at 110 CPS or 70 lines per minute. Parallel interface – 3 month warranty.	$1650 Purchase only	**$595 Purchase only**

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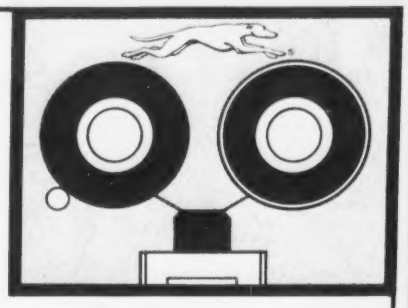

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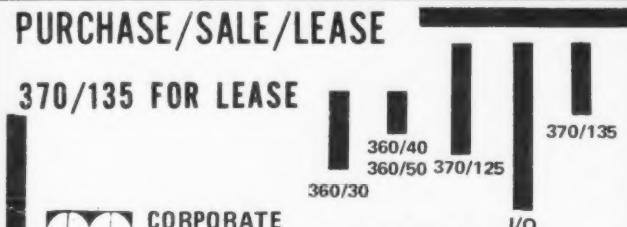

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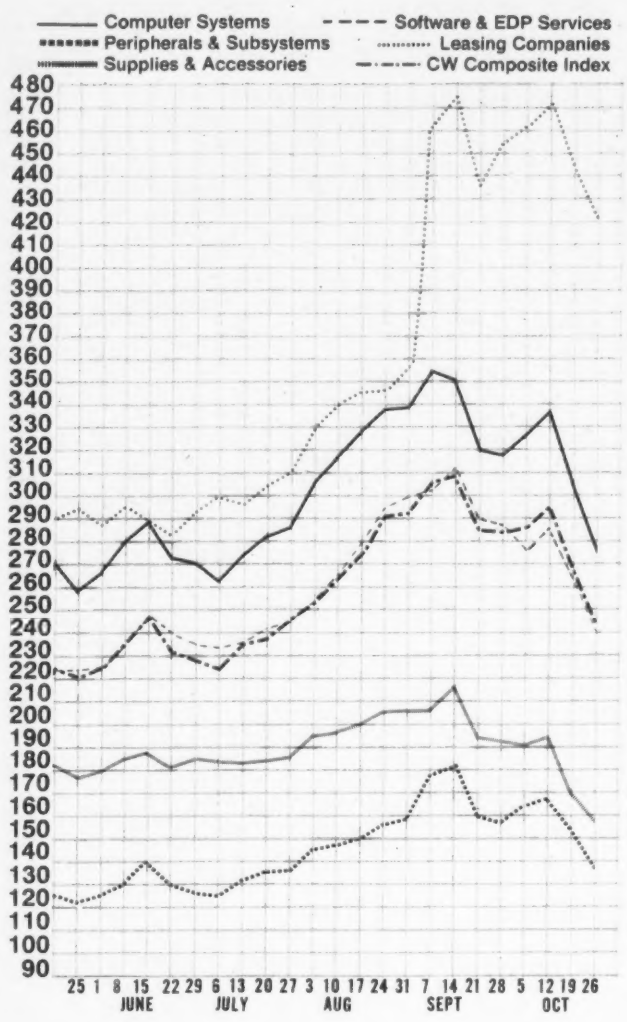

Earnings Reports

TESDATA SYSTEMS
Three Months Ended June 30

	1978	1977
Shr Ernd	$.35	$.41
Revenue	4,605,000	3,445,000
Earnings	441,000	486,000
6 Mo Shr	.68	.79
Revenue	8,777,000	6,724,000
Earnings	858,000	879,000

DIGITAL EQUIPMENT
Year Ended July 1

	1978 (000)	1977 (000)
Shr Ernd	$3.40	$2.78
Revenue	1,436,562	1,058,614
Earnings	142,189	108,500
3 Mo Shr	1.08	1.05
Revenue	412,552	330,345
Earnings	46,318	41,108

COMPUTER DATA SYSTEMS
Year Ended June 30

	1978	1977
Shr Ernd	$.74	$.27
Revenue	6,291,400	5,760,300
Disc Op	149,400	12,900
Spec Cred	62,400	2,600
Earnings	410,200	154,000

DATA DIMENSIONS
Three Months Ended June 30

	1978	1977
Shr Ernd	$.22	$.12
Revenue	3,647,000	2,490,000
Earnings	171,000	88,000
6 Mo Shr	.41	.21
Revenue	7,221,000	4,899,000
Earnings	319,000	159,000

DATARAM
Three Months Ended July 31

	1978	1977
Shr Ernd	$1.11	a$.93
Revenue	4,123,000	3,703,000
Earnings	573,000	489,000

a-Adjusted for a 10% stock dividend paid in June 1978.

INFORMATION INT'L
Three Months Ended July 31

	1978	1977
Shr Ernd	$.14	$.07
Revenue	3,661,219	2,493,883
Earnings	378,586	183,571

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 25, 1978

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

EXCH		1978 RANGE (1)	CLOSE OCT 25 1978	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	28- 69	43 3/4	-6 1/2	-12.9
N	BURROUGHS CORP	59- 87	71 1/4	-1	-1.3
O	COMPUTER AUTOMATION	20- 44	19 1/2	-6 3/4	-25.7
N	CONTROL DATA CORP	23- 44	32 1/2	-2 7/8	-8.1
O	CRAY RESEARCH INC	21- 74	53	-5	-8.6
N	DATA GENERAL CORP	42- 71	57 3/8	-2 3/8	-3.9
N	DATAPOINT CORP	34- 75	52 1/2	-7 1/2	-12.5
N	DIGITAL EQUIPMENT	39- 54	46	-1 7/8	-3.9
N	ELECTRONIC ASSOC.	2- 13	8 3/8	+ 1/8	+1.5
A	ELECTRONIC ENGINEER.	11- 19	12 3/8	- 7/8	-6.6
O	FOUR-PHASE SYSTEMS	19- 46	30 5/8	-4 3/4	-13.4
N	FOXBORO	28- 40	33 3/4	-1 3/4	-4.9
O	GENERAL AUTOMATION	7- 26	14 1/2	-2 1/8	-12.7
O	GRI COMPUTER CORP	1- 3	1 1/2	- 3/4	-33.3
N	HEWLETT-PACKARD CO	62- 93	80	-5 1/4	-6.1
N	HONEYWELL INC	43- 72	62 1/4	-3 3/8	-5.1
N	IBM	236-305	273 3/4	-6	-2.1
O	MANAGEMENT ASSIST	9- 29	17 1/8	-2 7/8	-14.3
O	MICRODATA CORP	10- 23	14 7/8	-2 3/8	-13.7
O	MINI-COMPUTER SYST	5- 8	5 3/4	- 3/4	-11.5
O	MODULAR COMPUTER SYS	7- 17	10 1/2	-1 1/2	-12.5
N	NCR	37- 67	61 5/8	-3	-4.6
N	PRIME COMPUTER INC	20- 43	29 1/4	-3 3/4	-11.3
N	PERKIN-ELMER	17- 28	22 1/8	-2 3/8	-9.6
N	RAYTHEON CO	29- 58	46 1/4	- 3/4	-1.5
N	SPERRY RAND	33- 49	42 1/8	-1 3/4	-3.9
A	SYSTEMS ENG. LABS	11- 24	14 1/2	- 1/2	-3.3
A	WANG LABS.	12- 32	23	- 7/8	-3.6
	LEASING COMPANIES				
O	BOOTHE COURTER CORP	13- 21	18 1/2	-1 1/2	-7.5
O	COMDISCO INC	5- 22	16 3/4	- 1/4	-1.4
A	COMMERCE GROUP CORP	1- 1	1/2	- 1/8	-20.0
A	COMPUTER INVSTRS GRP	1- 7	3 1/4	- 1/2	-13.3
M	DATRONIC RENTAL	1- 3	2 5/8	- 1/8	-4.5
A	DCL INC	3- 5	4	+ 1/8	+3.2
N	DPF INC	8- 14	11 5/8	-1 1/8	-8.8
N	ITEL	16- 36	26 3/4	-1 5/8	-5.7
N	LEASCO CORP	24- 36	33 3/8	-1	-2.9
O	LEASPAC CORP	1- 4	2 3/4	+ 1/4	+10.0
A	PIONEER TEX CORP	4- 7	4 1/8	- 1/4	-5.7
N	U.S. LEASING	13- 20	15 3/4	-1 1/4	-7.3

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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EXCH		1978 RANGE (1)	CLOSE OCT 25 1978	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	1 1/8	- 1/8	-10.0
O	ANACOMP INC	8- 22	13 1/4	-1 1/2	-10.1
A	APPLIED DATA RES.	8- 17	11 1/4	+ 1/8	+1.1
N	AUTOMATIC DATA PROC	24- 36	28 3/4	-2 1/4	-7.2
O	COLEMAN AMERICAN COS	1- 2	1 3/8	- 1/8	-8.3
O	COMPU-SERV NETWORK	7- 12	8 1/4	- 1/4	-2.9
O	COMPUTER HORIZONS	1- 9	7	- 1/4	-3.4
O	COMPUTER NETWORK	8- 16	8 1/2	-2 1/4	-20.9
N	COMPUTER SCIENCES	8- 17	12 1/2	- 3/8	-2.9
O	COMPUTER TASK GROUP	1- 4	3 3/4	- 1/4	-6.2
O	COMPUTER USAGE	2- 4	3	- 1/4	-7.6
O	COMSHARE	6- 19	14 1/4	-1 1/2	-9.5
O	CULLINANE CORP	19- 33	19 3/4	-3 1/4	-14.1
O	DATA DIMENSIONS INC	4- 9	6 3/8	- 1/4	-3.7
O	DATATAB	1- 2	1 1/8	- 1/8	-10.0
N	ELECTRONIC DATA SYS.	15- 25	18 1/4	-1	-5.1
O	INSYTE CORP	1- 3	1 1/8	- 5/8	-35.7
O	IPS COMPUTER MARKET.	2- 3	3	- 1/4	-7.6
O	KEANE ASSOCIATES	3- 6	4 1/2	- 3/4	-14.2
O	KEYDATA CORP	1- 3	2 1/8	- 1/4	-10.5
A	LOGICON	11- 19	12 1/4	-1 3/8	-10.0
O	MANAGEMENT DATA	1- 2	1/8	0	0.0
A	NATIONAL CSS INC	15- 36	24	-2 3/8	-9.0
O	NATIONAL DATA CORP	7- 13	9	- 7/8	-8.8
A	ON LINE SYSTEMS INC	17- 30	19 3/4	-3	-13.1
N	PLANNING RESEARCH	4- 10	6 7/8	- 3/4	-9.8
O	PROGRAMMING & SYS	1- 1	1 1/2	0	0.0
O	RAPIDATA INC	3- 7	4 5/8	- 7/8	-15.9
O	REYNOLDS & REYNOLD	18- 36	27 3/4	-1	-3.4
O	SCIENTIFIC COMPUTERS	3- 9	7 1/8	- 3/4	-9.5
O	TYMSHARE INC	18- 33	24 3/8	+ 1/2	+2.0
A	URS SYSTEMS	5- 8	5 7/8	-1 1/8	-16.0
N	WYLY CORP	1- 7	5	- 3/4	-13.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	14- 32	21 7/8	-2	-8.3
O	ADVANCED MEMORY SYS	7- 18	13 1/8	- 3/8	-2.7
N	AMPEX CORP	10- 19	13 7/8	-1 7/8	-11.9
O	ANDERSON JACOBSON	5- 10	5 3/4	- 7/8	-13.2
N	APPLIED DIG DATA SYS	11- 22	11 3/8	- 3/4	-6.1
O	BEEHIVE INT'L	4- 7	4 5/8	-1 1/8	-19.5
A	BOLT,BERANEK & NEW	6- 14	9 1/2	-2 1/8	-18.2
N	BUNKER-RAMO	10- 20	14 3/4	-1 1/2	-9.2
A	CALCOMP	3- 13	7 1/2	-1	-11.7
O	CAMBRIDGE MEMORIES	3- 9	5 5/8	- 1/4	-4.2
N	CENTRONICS DATA COMP	16- 37	26 3/8	-4 1/8	-13.5
O	COGNITRONICS	1- 4	2	- 1/4	-11.1
O	COMPUTER COMMUN.	6- 12	6 3/4	-1	-12.9
O	COMPUTER CONSOLES	4- 10	7 1/4	- 1/2	-6.4
A	COMPUTER EQUIPMENT	3- 6	4 5/8	- 3/8	-7.5
O	COMPUTER TRANSCEIVER	1- 3	3	- 1/4	-7.6
O	COMTEN	9- 38	25 1/2	-3 1/4	-11.3
N	CONRAC CORP	18- 26	18 1/8	-1 1/8	-5.8

EXCH		1978 RANGE (1)	CLOSE OCT 25 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	3- 14	11	- 1/2	-4.3
O	DATA 100	9- 20	19 1/4	0	0.0
A	DATA PRODUCTS CORP	15- 25	16 3/8	-2 3/4	-14.3
O	DATUM INC	2- 6	3 3/8	- 5/8	-15.6
O	DECISION DATA COMPUT	2- 6	3 1/8	- 1/2	-13.7
O	DELTA DATA SYSTEMS	1- 1	1 1/4	0	0.0
A	DOCUMATION INC	6- 34	22 1/8	-3 3/4	-14.4
O	DATARAM CORP	6- 32	23 1/2	-4 1/2	-16.0
N	ELECTRONIC M & M	4- 9	5 3/8	- 5/8	-10.4
O	FABRI-TEK	1- 2	1 1/8	- 1/4	-20.8
O	GENERAL COMPUTER SYS	1- 3	1 3/4	- 1/8	-6.6
N	HAZELTINE CORP	10- 17	12 5/8	-1 1/2	-10.6
N	HARRIS CORP	17- 36	30 1/2	-1 1/4	-3.9
O	INFOREX INC	6- 11	7 7/8	- 1/4	-3.0
O	INFORMATION INTL INC	8- 12	9	- 1/4	-2.7
O	INTEL CORP	39- 62	49	-2	-3.9
A	LUNDY ELECTRONICS	4- 8	5 3/8	- 3/8	-6.5
O	MSI DATA CORP	12- 19	12 1/4	-1	-7.5
N	MEMOREX	27- 59	31	-9 1/4	-22.9
N	MOHAWK DATA SCI	6- 15	8 5/8	-1 3/4	-16.8
O	OMEX	2- 6	5 1/2	- 1/2	-8.3
O	PENRIL CORP	5- 12	10 1/2	- 1/4	-2.3
N	PERTEC CORP	9- 17	11 5/8	-1 1/8	-8.8
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	QUANTOR CORP	2- 5	2 1/2	0	0.0
O	RECOGNITION EQUIP	7- 13	8 3/4	-1 1/4	-12.5
O	SCAN DATA	1- 5	2 3/8	- 1/4	-9.3
N	STORAGE TECHNOLOGY	19- 46	25 1/2	-4 3/4	-15.7
O	T BAR INC	11- 20	15 1/2	-2 1/2	-13.8
O	TALLY CORP.	4- 9	5 3/8	-1 3/8	-20.3
A	TEC INC	6- 13	8 1/2	- 3/4	-8.1
N	TEKTRONIX INC	33- 50	43	-2 1/2	-5.4
N	TELEX	3- 9	5 3/4	- 1/2	-8.0
O	TESDATA SYSTEMS CP	11- 23	10 1/2	-3 1/2	-25.0
O	WILTEK INC	1- 2	1 1/2	- 3/8	-20.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	6- 11	8	0	0.0
O	BALTIMORE BUS FORMS	2- 4	1	0	0.0
A	BARRY WRIGHT	14- 30	24 1/2	- 7/8	-3.4
O	CYBERNETICS INC	1- 1	5/8	- 1/4	-28.5
O	DUPLEX PRODUCTS INC	15- 30	15 1/2	- 1/2	-3.1
N	ENNIS BUS. FORMS	8- 17	10 7/8	-2 1/8	-16.3
N	3M COMPANY	43- 66	58	-1 3/4	-2.9
O	MOORE CORP LTD	26- 34	29 1/2	- 1/2	-1.6
N	NASHUA CORP	18- 37	26 7/8	- 7/8	-3.1
O	STANDARD REGISTER	20- 27	22	-2 1/2	-10.2
A	TAB PRODUCTS CO	8- 16	11 1/2	- 3/4	-6.1
N	UARCO	19- 31	30	+1 3/8	+4.8
A	WABASH MAGNETICS	10- 22	15 3/4	-2	-11.2
N	WALLACE BUS FORMS	18- 33	26	-1	-3.7

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